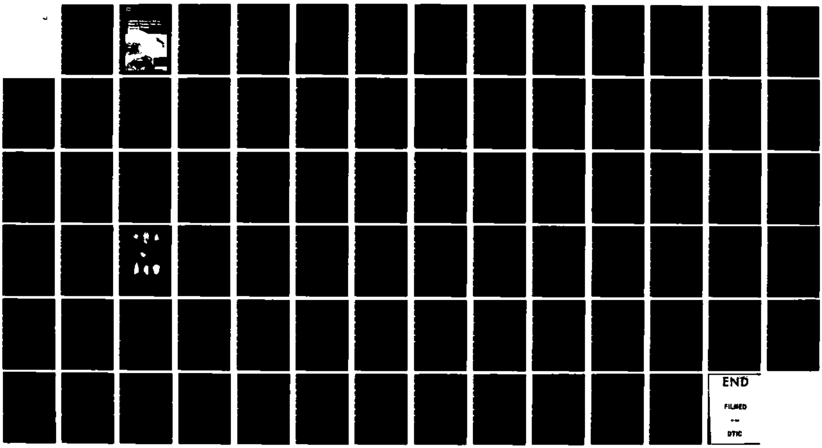
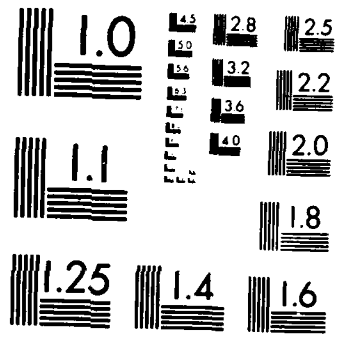
AD-A143 483 CULTURAL RESOURCES SURVEY HARRY S TRUMAN DAM AND RESERVOIR PROJECT MISSOU..(U) MISSOURI UNIV-COLUMBIA AMERICAN ARCHAEOLOGY DIV M PIONTKOWSKI ET AL. FEB 83 1/1

UNCLASSIFIED DACW41-75-C-0202 F/G 5/6 NL





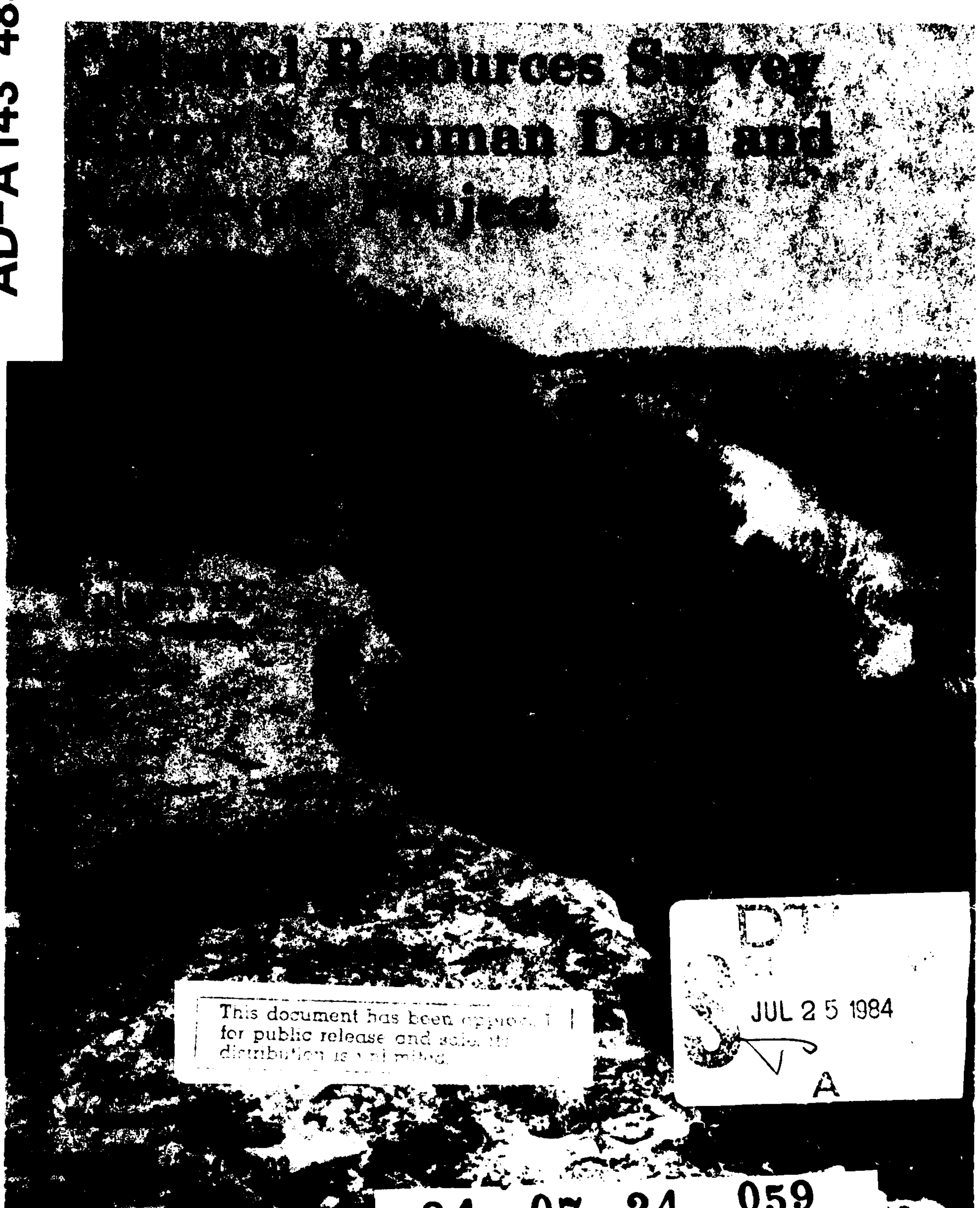
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

US Army Corps of Engineers
Kansas City District

Harry S. Truman Dam and Reservoir, Missouri

American Archaeology Division Department of Anthropology, University of Missouri - Columbia
Columbia, Missouri

AD-A143 483



This document has been approved
for public release and sale; its
distribution is unlimited.

DTIC
JUL 2 5 1984
A

DTIC FILE COPY

84 07 24 059

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER / 2. GOVT ACCESSION NO. AD-A143 487	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Cultural Resources Survey, Harry S. Truman Dam and Reservoir Project, Missouri, Volumes I - X	5. TYPE OF REPORT & PERIOD COVERED FINAL 1975-1980
	6. PERFORMING ORG. REPORT NUMBER N/A
7. AUTHOR(s) Curtis H. Synhorst, Nanette M. Linderer, Donna C. Roper, Michael Piontkowski, Deborah E. House, Lisa G. Carlson, David E. Griffin, Michael K. Trimble,	8. CONTRACT OR GRANT NUMBER(s) Contract Number: DACW41-75-C-0202
9. PERFORMING ORGANIZATION NAME AND ADDRESS University of Missouri - Columbia American Archaeology Division, Department of Anthropology, Room 15 - Switzler Hall Columbia, Missouri 65211	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS N/A
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Engineering District, Kansas City 700 Federal Building, 601 East 12th Street, Kansas City, Missouri 64106	12. REPORT DATE February 1983
	13. NUMBER OF PAGES 2,054
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) US Army Engineering District, Kansas City 700 Federal Building, 601 East 12th Street, Kansas City, Missouri 64106	15. SECURITY CLASS. (of this report) Unclassified
	15a. DECLASSIFICATION DOWNGRADING SCHEDULE Unclassified

16. DISTRIBUTION STATEMENT (of this Report)

Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Historical Gazeteer	Euro-American Settlement	Sac River
History	Site Testing	Pomme de Terre River
Architectural Survey	Rock Shelters	Grand River
Archeological Survey	Environmental Studies	Deepwater Creek
Artifact Analysis	Osage River	Tebo Creek

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The ten volumes report the results of a cultural resources survey in the Harry S. Truman Dam and Reservoir Project, Henry, Benton, St. Clair, and Hickory counties in southwestern Missouri. The combined volumes relate the findings of historical, architectural, archeological surveys conducted between 1975 and 1977. Volume I contains an outline of Osage River history to serve as a background for historical studies; Volume II is a historical gazeteer. Volume III contains the architectural survey of the reservoir. Volumes IV

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Block 20.

through IX report the archeological survey of the reservoir. Volume IV is a description of the archeological survey, the results of that survey, and an analysis of prehistoric settlement-subsistence patterns in the reservoir area. Volume V contains analyses of surface collections obtained during the survey, and includes studies of chipped stone tools, ground stone tools, hematite, ceramics, and projectile points.

Volume VI consists of an interpretation of the Euro-American settlement of the lower Pomme de Terre River valley. Volume VII is a study of the results of preliminary testing at several sites in the lower Pomme de Terre River valley. Volume VIII contains the results of excavations in rock shelters along the Osage River. Volume IX contains studies relating to tests conducted in early occupation sites in the reservoir area, and an analysis of some Middle Archaic materials.

Finally, Volume X contains four environmental study papers, detailing the bedrock and surficial geology, the historic plant resources, and special studies of the soils and geology or portions of the reservoir.

Block 7.

Russell L. Miller, Stephen A. Chomke, Andrea L. Novick, Charles E. Cantley, Janet E. Joyer, R. A. Ward, T. L. Thompson, C. V. Haynes, F. B. King, and D. L. Johnson.

CULTURAL RESOURCES SURVEY

HARRY S. TRUMAN DAM AND RESERVOIR PROJECT

VOLUME IX

PRELIMINARY STUDIES OF EARLY AND

MIDDLE ARCHAIC COMPONENTS

by

Michael Piontkowski
and
Janet E. Joyer

A PROJECT CONDUCTED FOR THE
UNITED STATES GOVERNMENT
U. S. ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT

Under Contract No. DACW41-75-C-0202

by

AMERICAN ARCHAEOLOGY DIVISION
DEPARTMENT OF ANTHROPOLOGY
UNIVERSITY OF MISSOURI-COLUMBIA

1983

REPORTS OF THE

CULTURAL RESOURCES SURVEY

HARRY S. TRUMAN DAM AND RESERVOIR PROJECT

Accession For
NTIS GRA&I
DTIC TAB
Unannounced
Justification
By
Distribution/
Availability
Dist
A-1

TABLE OF CONTENTS

PART I

PRELIMINARY ARCHEOLOGICAL INVESTIGATIONS
AT TWO EARLY ARCHAIC SITES:
THE WOLF CREEK AND HAND SITES

by

Michael Piontkowski

PART II

THE DISTRIBUTION OF MIDDLE ARCHAIC COMPONENTS IN THE TRUMAN RESERVOIR AREA

by

Janet E. Joyer

LIST OF PLATES

PART I by Michael Piontkowski

LIST OF TABLES

PART I by Michael Piontkowski

PART II by Janet E. Joyer

LIST OF FIGURES

PART I by Michael Piontkowski

PART II by Janet E. Joyer

PART I

PRELIMINARY ARCHEOLOGICAL INVESTIGATIONS AT TWO EARLY ARCHAIC SITES: THE WOLF CREEK AND HAND SITES

by

Michael Piontkowski

INTRODUCTION

The research design developed and implemented for the Harry S. Truman Reservoir archeological program of the cultural resources survey has focused on locating and recording archeological sites. The research strategy outlines the methods for systematically surveying modern geomorphic surfaces, making a collection of the material culture, and analyzing site locations and materials (Volume IV). These data are the primary variables for describing and analyzing the settlement-subsistence systems of human groups in the Ozark Highland and adjoining grasslands. However, not all sites are readily amenable to surface survey data collection and analysis methods.

This fact became dramatically clear in July 1976 when two sites, each buried two to three meters below the present surface, were located during surface survey. A Dalton projectile point was found in a small stream cut-bank along with a few chert flakes (the Hand site); while the other site (the Wolf Creek site) was found at the mouth of a small creek on the Osage River. No diagnostic cultural material was obtained at the latter site, but preliminary investigation of the cultural zone indicated it was within at least one buried paleosol.

The outstanding feature of these two sites was in their depositional and temporal aspects. Unlike most recorded sites, the Dalton materials at the Hand site are about three meters below the surface in a well developed soil, and the cultural materials at the Wolf Creek site are one to two meters below the present surface ir buried soil. The inferred temporal position of b h occupations was Early-Middle Archaic. By contras few of the other recorded sites had yielded Dalton o ly Archaic materials. The primary clue for the dati of the two sites was therefore comparison with the Dalton site found eroding from the stream bank on a large meander of the Sac River downstream from the Stockton Dam (Roper 1977).

The discovery of this latter site was one motive for assuming that most of the locations of man's early occupation in the reservoir were buried in river terraces. The post-Pleistocene sedimentary sequence in the lower Pomme de Terre River valley also supported this assumption. Analysis of the sediments at Rodgers Shelter (Ahler 1973a, 1973b) and in the nearby terrace deposits (Haynes 1976) indicates that the Pomme de Terre River underwent a period of extensive and rapid aggradation 10,500-6000 years ago. Sediments very similar to those in the lower Pomme de Terre valley are present at the Hand and Wolf Creek sites. The temporal provenience of these two sites, as indicated by the diagnostic artifacts, supports the contemporaneity of the sediments in these two locales. Therefore, the assumption that the near-absence of early debris on the modern surface was the result of past geomorphic processes was tentatively supported when the Wolf Creek and Hand sites were found and examined. Several other sites in the same deposits were subsequently found.

Two lines of evidence were especially important in the test excavations at the Hand and Wolf Creek sites: archeological and pedological. The studies of the terraces and their alluvial sediments within a small part of the reservoir have greatly aided in the reconstruction of past environments. Concomitant with the work undertaken by Dr. C. Vance Haynes, the soils geomorphology of part of the reservoir is being studied under the direction of Dr. Donald L. Johnson (University of Illinois, Urbana-Champaign). Both Haynes and Johnson believed that potentially valuable data could be obtained through testing the Wolf Creek and Hand sites. The archeological data provided a temporal baseline to aid in the determination of rates of aggradation, the process of terrace development, and the rates and processes in the formation of soils. The soils, in return, could yield minimal indications of the environments under which they were deposited and developed, thus aiding in environmental reconstruction for the periods when the sites were occupied.

Further, testing at the two sites was necessary so that a sample of cultural material could be recovered. Analysis of tools and their inferred role in the technologic and economic behavior of a society is an integral part of the ongoing analysis of the surface sites. The lack of an exposed horizontal surface in a buried site severely limits any easy collection of the material culture for analysis. Therefore, examining the place these early buried sites held in the subsistence-settlement system was almost wholly dependent on a testing strategy. Two sampling and data recovery strategies were implemented at the Wolf Creek Site. A 1 x 4 meter trench was the primary sampling unit. This trench afforded a view of the internal structure of the site (culturally and physically) and helped secure a stratified sample of debris. Bank profiling was also employed. This latter technique was also employed at the Hand Site to evaluate the extent and nature of the buried deposits.

In summary, test excavations at the two buried sites were conducted to evaluate their nature and extent, to expand and refine the cultural sequence in the Ozark Highland, to investigate the structure of and relationship to other contemporaneous sites in the region, and to supplement other disciplines' research in the reconstruction of past environments and geomorphic processes.

ENVIRONMENTAL SETTING

Both sites are in the floodplain of the Osage River in the physiographic area transitional between the Western Prairie and the Ozark Highland (Fig. 1). This is best exemplified by the character of the Osage River in the vicinity of the two sites.

The Osage River generally exhibits a meandering course incised into the undulating prairie and the Ozark Highland. The western portion of the river is relatively straight with a wide floodplain, in contrast to the river's behavior further to the east in the Ozark Highland. Near the sites the Osage is straight for about six miles. Five miles downstream (north) it enters the Ozark Highland where large, tightly curving meanders are incised 200 to 300 feet into the plateau.

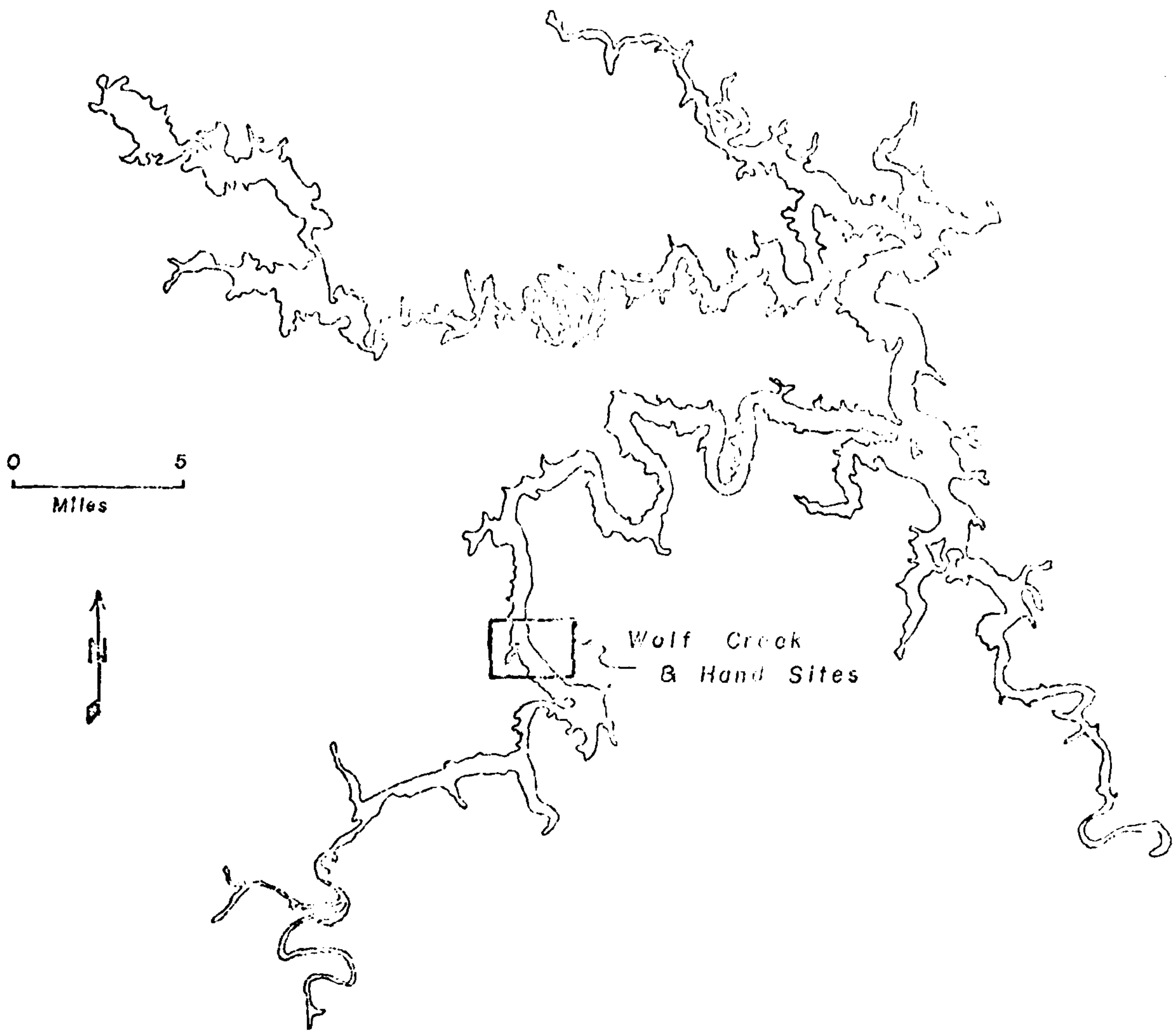


Fig. 1. Truman Reservoir, showing location of Wolf Creek and Hand sites. The area enclosed by the rectangle is shown in Figure 2.

A river's behavior is not static: its channel and floodplain are continuously undergoing change. Meanders migrate across the floodplain and downstream simultaneously, point-bars are built up and stream banks erode, and occasionally the floodplain is inundated with flood discharge (Leopold and Wolman 1957; Langbein and Leopold 1966). The net result is the building of terraces, and numerous channel changes, coupled with continual erosion and deposition within the floodplain. These processes are continuous and are not the direct result of geological and/or climatic changes (Langbein and Leopold 1966; Ruhe 1975: 70). A description of the Osage River basin today is therefore not an accurate representation of its character 10,000 years ago. A matter of concern here is the relationship of the channel and floodplain to the location of prehistoric sites. Although the Wolf Creek site overlooks the present channel of the Osage River and Wolf Creek, a very different relationship may have existed during the site's occupation. Detailed analysis of the sediments and their stratigraphic placement are not available at this time. Only one small portion of a stream regime in the reservoir study area has been investigated and a preliminary model of environmental changes constructed for that setting (Wood and McMillan 1976). Data necessary to test this model in other areas of the reservoir are not yet available. The Wolf Creek and Hand sites therefore provide some of the first opportunities for testing the environmental model based on Rodgers Shelter outside the Pomme de Terre Valley. The present report is therefore a descriptive summary of the archeological investigations at the Hand and Wolf Creek sites. Future investigations will be directed to the study of past geomorphic surfaces and environmental changes, and their relation to the archeological record.

THE WOLF CREEK SITE, 23SR567

Description and Excavation

Wolf Creek is an intermittant tributary of the Osage River, flowing generally to the northeast; it empties into the Osage from the west approximately 6 miles northeast of Osceola, Missouri (Fig. 2), assuming a meandering course as it enters the Osage bottoms proper. The convex side of a meander loop (the south bank of the creek) has eroded into Holocene terrace deposits and exposed cultural debris.

The Wolf Creek site was located during transect survey in late July 1976. Flakes and two bifacial artifacts were found eroding from the creek bank about two meters below the surface. Shovel testing on the surface revealed no cultural material.

Donald L. Johnson and Michael Miller, project soils geomorphologists (University of Illinois, Champaign-Urbana), and W. Raymond Wood, project director (University of Missouri-Columbia), briefly examined the site several weeks later. A preliminary soils and stratigraphy assessment identified a buried paleosol from which the cultural material was eroding, suggesting that the cultural zone was reasonably old. Without culturally diagnostic material, however, it was impossible to assign a date to either the soils or the cultural materials.

Examination of the creek bank indicated that the cultural zone was about two meters below the surface and about 20 meters west of the river. Limited testing of

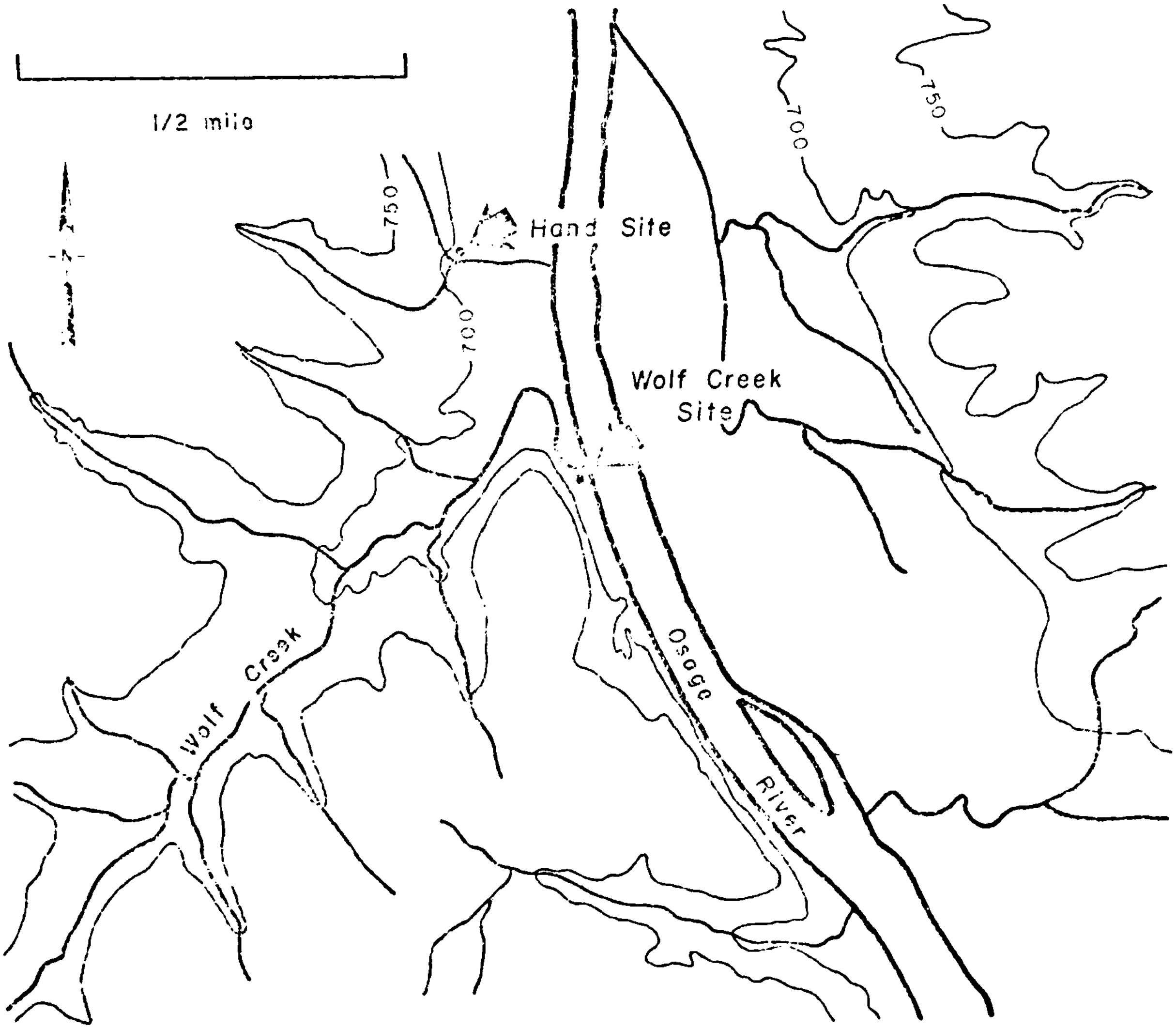


Fig. 2. Map: Wolf Creek and Hand sites and vicinity. See Figure 1 for their relationship to the Truman Reservoir.

the site was therefore conducted in order to determine the relative age of the cultural deposits and clarify their position within the natural deposits. A test trench exposed a horizontal area and determined the nature of the deposits, and profiling along the bank of Wolf Creek determined the extent of the cultural deposits.

A working datum was established at the base of the slope to the west of the site. Excavation units were, however, numbered from an arbitrary datum 100 meters south and 100 meters west of the northwest corner of the trench. All excavations were therefore in the northeast quadrant of the grid. Squares were designated by their northwest corner.

A one by four meter test trench was laid out about two meters south of the bank of Wolf Creek. The trench was excavated by hand in 10 cm layers. The two northernmost squares (100N100W and 99N100W) were excavated to the bottom of the cultural zone, 2.5 meters below the surface, while squares 98N100W and 97N100W were used to step down the excavations and were not as deep. Vertical provenience was measured from the surface from the northwest square corner; horizontal provenience was triangulated with reference to this same point.

The creek bank was extensively profiled to define the somewhat complex soil profile and to delineate the horizontal extent of the cultural layer. A 2-meter wide profile was cut into the bank directly north of the test trench, extending from near the present surface to a depth in excess of 3 m and well into the C-horizon of the soil profile. This profile further revealed that most of the cultural debris was eroding from the lower member of two buried soils. A profile of this cultural layer was then extended east from the soil profile for a distance of 8 meters. The locations of flakes were marked and later plotted on a profile map.

Stratigraphy

In order to adequately determine the age of the site and its relation to the natural deposits, it was necessary to describe the soils/sediments and their stratigraphic relationships, and to interpret the geomorphic processes which transported, deposited, and formed the soils. C. Vance Haynes and Donald L. Johnson have both examined and described the natural deposits. The discussion here is based on Haynes' field notes which he has graciously provided for inclusion in this report. These notes provide a general view of the natural stratigraphic units and help to define the geological context in which the archeological materials occur. They should, however, be taken as a preliminary description of the geological context of the archeological deposits.

The units in Table 1 and Figure 3 are transcribed from Haynes' notes. I have added depth from surface measurements which are extrapolated from the rough scale on his notes. Except for those units noted, no soil horizon designations were made by Haynes. The important aspect of these notes is the relative indication of the two buried soils. The upper approximately 40 cm (Modern Soil) is recent alluvium with a weakly developed soil and no prehistoric cultural debris. The next lowest natural unit is a well developed soil (buried soil II) in approximately 90 cm of alluvium. Although some archeological materials may be included in the lower

30 cm of this unit, it is most probable that this inclusion is the result of mixing of the lower unit during horizonation of the middle unit (Fig. 3).

The stratum of greatest importance to this report is the lowest soil. It extends from about 130 to 350 cm below the surface (Fig. 3). This highly developed soil formed in sediments identified as Rodgers Alluvium. There are, therefore, three depositional episodes at the Wolf Creek locale. The lowest deposit is a sedimentary/geomorphic unit first defined at Rodgers Shelter, and represents a period of river aggradation probably from 10,500-6000 BP (Haynes 1976: 52-60; Ahler 1973a). It is overlain by another well developed soil in similar sediments. No estimate of this period of deposition is possible, as there are no archeological materials in this unit. Coring and cut-bank examination around the mouth of Wolf Creek indicate that this middle unit is limited to the site locale. Further coring in the area and quantitative sediment analysis will be necessary to interpret this unit's history and its correlation with other geomorphic events.

The soils that developed in the lower two depositional units represent periods of decreased rates of and/or cessation of deposition, followed by enough time for soil development to take place. The uppermost depositional unit and the soil are probably still undergoing deposition and development.

Features

The only feature recognized was a concentration of small bifacial trim flakes associated with fire-cracked

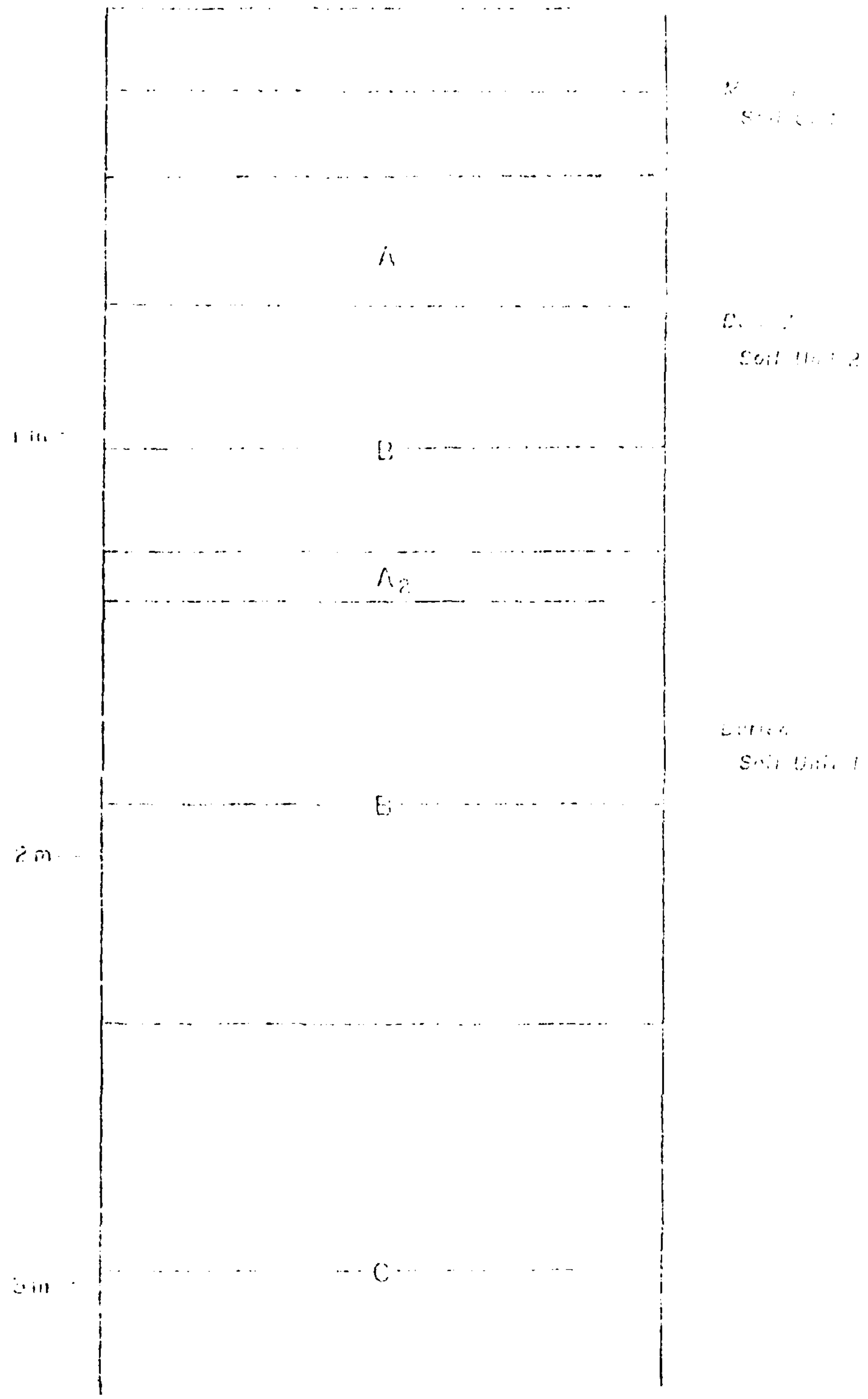


Fig. 3. Wolf Creek site: stratigraphy and soils.

TABLE 1

Wolf Creek Site: Sediment Characterization
Transcribed from Haynes' Field Notes of December 1976

0-20 cm	Brown-gray clayey-silt; moderate-fine to medium subangular blocky; maximum fine rootlets
20-40 cm	Transitional; moderate-medium angular blocky to fine
40-70 cm	Yellow-brown clayey-silt; weak to medium coarse angular blocky; root molds
70-105 cm	Light brown clayey-silt; weak-to moderate medium coarse prismatic blocky breaking to fine angular
105-130 cm	Brown clayey-silt; black Mn stains; moderate-medium prismatic breaking to blocky; root molds
130-140 cm	Pale gray silt (A_2); weak-medium angular blocky; root molds; sharp contact
140-190 cm	Mottled brown-gray clayey-silt; weak silt and clay skins; moderate-strong medium prismatic breaking to blocky
190-240 cm	Dark brown-gray silty-clay; strong clay skins; Mn stains; illuvial gray silt in cracks; strong-medium prismatic breaking to blocky
240-300 cm	Transitional zone; gradual contacts over 20 cm
300-	Red-brown clayey-silt, with brown clay skins; black Mn stains; moderate-strong angular blocky breaking to strong fine angular in frost worked surface; root molds

rock. This feature was in the southeast corner of 100N/100W and the northeast corner of 99N/100W, near the floor of level 1.25-1.35 m.b.s. A roughly circular area 80 by 40 cm was delineated by about twelve pieces of fire-cracked rock 4 to 10 cm in diameter (Fig. 4). The concentration of bifacial retouch flakes was immediately around and within the circular arrangement or rocks. No readily visible soil discoloration or concentration of charcoal was noted near the feature. No other pieces of fire-cracked rock as large as those in the feature were found during the excavation, although small localized traces of charcoal (stains) were noted occasionally.

Artifact Description

A classification system for the technological, morphological and functional attributes of a lithic assemblage was selected for the artifact analysis. A full description of the structure and attributes of this system is available in the report of the survey of an area downstream from the Stockton Dam (Roper 1977: 40-78), and that classification is used here to maintain descriptive and analytic compatibility within the reservoir study area. This classification assessed assemblage variability within and between sites assumed to be in the same or similar settlement systems. Primary variables used to assess variation were types and degree of utilization, breakage patterns, and stages of reduction in the manufacture of chert artifacts.

A definition of the criteria for class assignment is followed by a description of the variability within that class. Roper (*ibid.*) describes twenty-four classes,

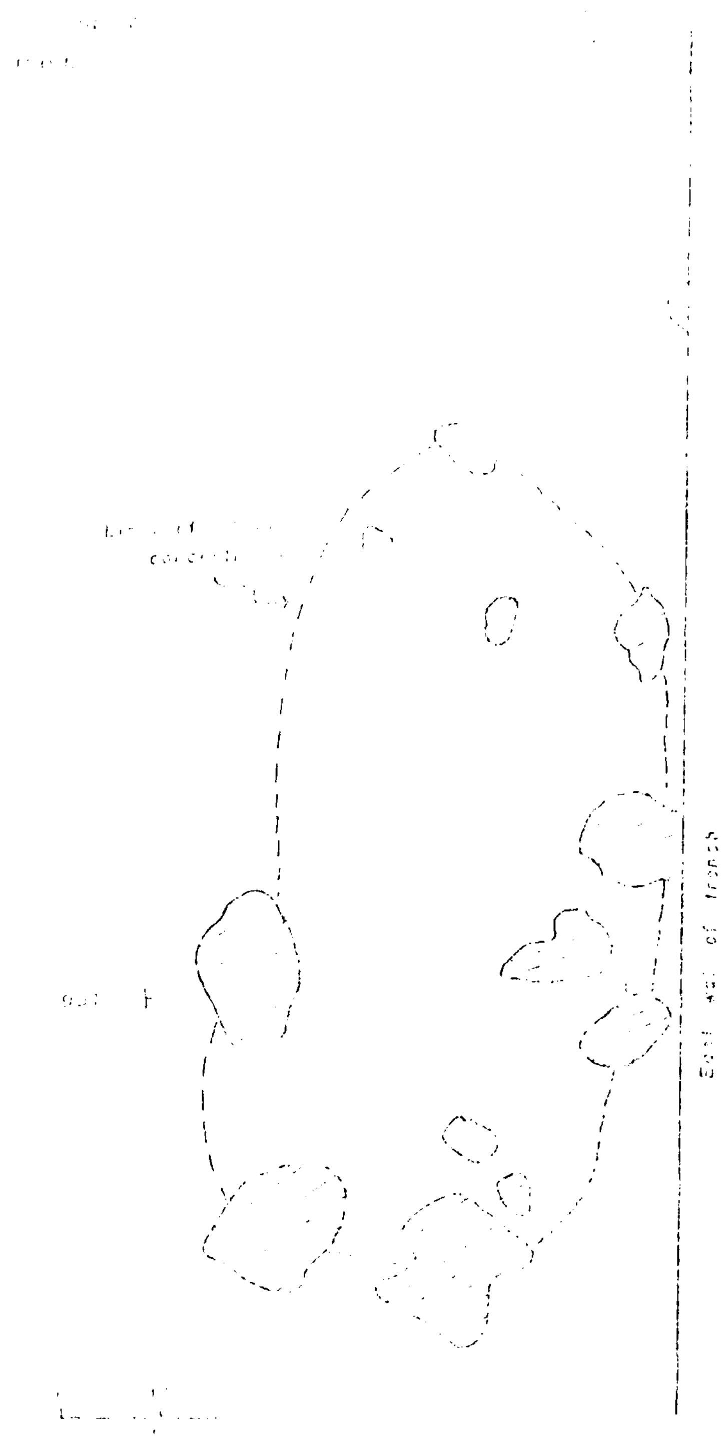


Fig. 4. Feature 1.

including unifacial and bifacial tools and four classes of flakes and debitage. Thirteen of those classes are present at the Wolf Creek site. Table 2 summarizes the provenience and dimensions for each specimen described below.

Class 1: Points - 1 specimen (Pl. 1a)

Defining criteria: Chert as raw material; bifacially worked; haft element present; lateral margins meet in a point.

Description: Blade - triangular in outline; straight lateral margins; beveled edges, probably as the result of resharpening; cross-section is trapezoidal. Haft element - the base is deeply notched, producing a bifurcate stem with round corners (one of which was slightly damaged during excavation); corner notches extend about one half the total length of the specimen; small ears are present at the shoulders; there is no grinding on the stem. Flaking - bifacial pressure retouch flake scars on the blade edges extend across one third of the blade face; lateral and basal margins of the stem are similarly retouched; a large, shallow flake scar extends from the proximal end of the base onto the blade face, probably as an effort to thin the haft element.

Dimensions: Haft length = 14 mm; notch width = 23 mm; base width - 31 mm; (see Ahler 1971 for definition of measurements).

Class 5: Ovid Biface - 1 specimen (Pl. 1b)

Defining criteria: Chert as raw material; bifacially worked; rounded ends.

Description: One round and one square end; edge margins convex; general body outline ovoid; large percussion flake scars; no edge utilization evident; square end and portion of adjacent edge indicate that trimming and thinning was not completed, probably due to numerous inclusions in the chert.

Class 6: Pointed End Segment - 1 specimen (Pl. 1c)

Defining criteria: Chert as raw material; bifacially worked; broken specimens truncated by transverse fracture, which retain portions of lateral margins meeting in a point.

Description: Lateral margin shape is convex; no grinding exhibited; large retouch scars indicate percussion preparation; step-fracturing and small utilization scars on lateral margins indicate heavy use.

Class 8: Rounded End Segments - 2 specimens (Pl. 1d-e)

Defining criteria: Chert as raw material; bifacially worked; broken segment truncated by a single transverse fracture; portions of lateral margins retained; rounded and continuous with lateral margins.

Description: Lateral margins are convex in outline; no grinding is present, although one specimen exhibits a dulled end and lateral margin, probably from use; same specimen displays numerous small retouch flake scars and is probably a bifacial preform (8a); the other specimen (8b) displays only large percussion thinning flake scars.

Class 14: Scraper - 1 specimen

Defining criteria: Chert as raw material; unifacially worked; steep beveled edge.

Description: A small fragment; flake morphology not determinable; edge is not beveled but is heavily utilized.

Class 15: Utilized and/or Retouched Flakes - 4 specimens

Defining criteria: Chert as a raw material; working consists exclusively of retouch and/or utilization along the margins of one face only.

Description: Specimen 15a is a large primary flake which terminates in a hinge fracture; random percussion flake scars on both faces and edge margins; working edge is on right lateral margin adjacent to the striking platform; step-fracturing indicates utilization and a few retouch scars indicate edge modification. Specimen 15b is broken, with indeterminate morphology; the working edge is slightly concave; the edge is modified by retouch. There are two complete secondary flakes (15 c,d); each has one highly concave working edge; the working edge is discontinuous on the right lateral margin, one area is adjacent to the striking platform, the other adjacent to the distal end (which terminates in a hinge fracture); both working edges are at the maximum thickness of the flake; utilization is indicated by step-fractures on the working edge.

Debitage

"The remaining categories of chert artifacts are those normally considered by-products of the manufacture of other chipped stone tools. They were either removed from another piece of chert during the course of manufacture of a tool or were the piece from which flakes were being removed. In either case, the specimen has not been further visibly modified" (Roper 1977: 71).

Class 16: Cores - 3 specimens, 16a, 16b, 16c (Pl. 1f)

Defining criteria: Chert as raw material; large angular piece of chert, not bifacially or unifacially worked but, rather, flakes were taken from all surfaces.

Description: Two specimens have no cortex remaining, while the other retains about one third of its cortex; minimal platform preparation; all were randomly flaked.

Class 17: Chert Hammerstones - 1 specimen

Defining criteria: Same as Class 16 but with battering along one or more platform margins.

Description: Specimen is a cobble core, perhaps a split cobble; cortex is retained on the platform, battering is restricted to one margin.

Class 18: Shatter - 113 specimens

Defining criteria: Chert as raw material; angular pieces of chert, broken along more or less straight cleavage planes, with no bulbs of percussion or striking platforms.

Description: Shatter is a by-product of the chipping process. Usually the shock of striking chert produces pieces with no flake characteristics.

Class 19: Cortex Flakes - 4 specimens

Defining criteria: Chert as raw material; unworked; retains a striking platform and a bulb of percussion and/or rippling on the ventral face indicating it is the result of a direct blow; cortex covers the entire face.

Class 20: Primary Flakes - 6 specimens

Defining criteria: Chert as raw material; retains a large flat striking platform and a prominent bulb of percussion; length of force axis is over 50 mm.

Class 21: Secondary Flakes - 48 specimens

Defining criteria: Chert as raw material; unworked; retains a large flat striking platform and prominent bulb of percussion; length of force axis is less than 50 mm.

Class 22: Flakes from Bifacial Retouch - 449 specimens

Defining criteria: Chert as raw material; unworked; striking platform and bulb of percussion present, and/or ripples indicating their presence on a broken flake; no cortex.

Description: Striking platforms frequently are wide, having been torn from the edge of the biface. The flake itself is thin and has faceting on the dorsal face indicative of previous flake removal.

Other Debris Classes

Fire-cracked rock was not collected during the Downstream Stockton Survey and was therefore not defined or described by Roper (1977). It was, however, included in the assemblage excavated from the Wolf Creek Site.

TABLE 2

23SR567, Metrical Attributes and Provenience of Debris and Artifacts

Class No.	Length (mm)	Width (mm)	Thickness (mm)	Edge Angle (°)	Square No.	Level: M.B.S.
1	43	40	8	59	99.52N/100W	2.31
5	92	44	14	45	8E	2.20
6	-	-	-	50	2E	1.10-2.10
8a	-	-	-	45 & 38	99.38N/99.62W	1.63
8b	-	-	-	62 & 50	1E	2.21
14	-	-	-	75	99N/100W	2.05-2.15
15a	60	51	9	56	100N/100W	2.05-2.15
15b	-	-	-	84	99N/100W	2.05-2.15
15c	45	27	11	70	100N/100W	.80-.95
15d	44	32	11	70	100N/100W	2.25-2.35
16a	-	-	-	-	100N/100W	2.35-2.45
16b	-	-	-	-	98.20N/99.95W	1.01
16c	-	-	-	-	99.37N/99.94W	2.12
17	-	-	-	-	98N/100W	1.95-2.05

- Measurement not taken.

Fire-cracked rock is characterized as angular, coarse-grained chert ranging in size from cobbles to small pieces of shatter. Angularity, lack of flake morphology, and the tendency to be found in concentrations are the usual criteria of rock that has been used to confine fire (House and Smith 1975: 76). The heat of the fire causes the nearby rock to explode and/or break apart due to water in its molecular structure, the heating forcing the molecules of the rock apart. This process normally occurs along natural cleavage planes, the result being the angular breaks and small size of the specimens observed archeologically. This class comprises the major portion of Feature 1; in fact, it is the primary characteristic used to differentiate this feature from the usual randomly distributed debris found in most other levels (Fig. 4).

A number of soil samples were collected and subjected to water flotation to determine whether or not bone, molluscs, and macro-floral remains were present. None of these classes were observed in either the excavations nor in the flotation samples. Several factors could explain the lack of these classes, but the most probable explanation is poor preservation factors in the soil. This negative evidence need not imply that these classes were not present whenthe site was occupied.

Discussion

The Lithic Assemblage

The lithic assemblage from test excavations at the site is quantitatively small and limited in diversity. A number of factors may have limited the sample. First, the sample size must be considered along with its adequacy for providing a reliable sample.

It is assumed that a cultural system not only differentially utilizes space (i.e., a region), but also that each site is differentially utilized. A given location could have a number of subsistence-related activity areas separated by space and/or superimposed on one another. Other variables such as duration of activity, number of types of activities, and degree of debris disposal all influence the debris densities and the arrangement of that debris at a given locale. Although reconstruction of activities and their distribution is ultimately of interest, at the present time the test trench serves primarily as a sounding of the context and relationship of the general archeological zone and the stratigraphic relationships of its natural units.

The limited artifact sample does allow a preliminary assessment of the kinds (but not necessarily the range) of techno-economic activities performed at the site. Maintenance activities are indicated by the cores, shatter and bifacial trim flake classes. It is interesting to note that the majority of cores co-occur with the highest concentration of shatter (Tables 3, 5), an expected correlation. However, if tool manufacture was performed at the site, it could be expected that the primary and secondary flake classes would be larger. Two of the utilized flakes are in close association with the cores, along with the highest numbers of primary and secondary falke classes (Table 3). The concave working edges of the flakes along with the fragmented scraper and bifacial tool classes indicate activities more directly associated with extracting and processing resources. Tool maintenance

TABLE 3

Wolf Creek - Distribution of Debris by Level: 100N/100W

Vertical Provenience	Level No.	DEBITAGE Primary	Secondary	Bifacial Retouch	Shatter	Fire-Cracked Rock	Artifacts and Comments
.80-.95		1	2	4	3	3	Utilized flake
.95-1.00	2	0	1	1	0	0	
1.00-1.05	2	0	0	1	0	0	
1.05-1.15	3	0	0	8	0	3	
1.15-1.25	4	0	0	3	3	0	
1.25-1.35	5	0	0	6	0	68	Feature 1
1.35-1.45	6	0	0	0	0	12	
1.45-1.55	7	0	0	0	0	2	
1.55-1.65	8	0	0	1	0	2	Rounded end segment
1.65-1.75	9	0	0	0	0	1	
1.75-1.85	10	0	1	0	0	0	
1.85-1.95	11	0	1	3	0	0	
1.95-2.05	12	0	1	0	0	1	
2.05-2.15	13	1	2	6	4	0	Utilized flake; core
2.15-2.25	14	0	0	2	6	1	
2.25-2.35	15	1	2	13	8	5	Utilized flake; point
2.35-2.45	16	0	3	20	11	2	Core
2.45-2.55	17	0	1	3	6	5	

is another activity set, as shown by the bifacial retouch flake class. The following discussion of stratigraphy explores the vertical distribution of these classes.

Cultural stratigraphy: Vertical distribution of debris classes

When test excavations were initiated, it was anticipated that the cultural zone was a thin layer, buried about two meters below the present surface. It soon became apparent that it was actually much thicker and started much closer to the present ground surface, at least in the test trench.

It was obvious during initial profiling of the creek bank that the densest concentration of cultural materials was in the B-horizon of the lowest buried soil (190-240 cm below the surface) (Fig. 3). No distinct natural or cultural stratigraphic breaks were, however, obvious above or below this unit, either in the profile or in the test trench (Table 3). Rodgers Alluvium at Wolf Creek is over 2.5 m thick, and the highly developed soil in it implies a long period of development and a stable surface. During the time the sediment was being deposited, later to develop a soil, cultural groups occupied the area, and over 1.5 m of cultural materials was deposited and buried. A number of alternative explanations may be considered.

Rapid deposition over a short period of time could leave massive amounts of sediments, especially if the river were nearby. Therefore, the archeological materials could represent a short period of time, ie., 1000 years or less (perhaps even much less).

Given the thickness of the cultural zone, it was desirable to search for modes (or peaks) of debris density in the profile to see if stratification was apparent or if the deposit was homogeneous throughout. Frequency distributions of shatter and bifacial retouch falkes were computed by level and are graphed in Figs. 5 and 6. Two modes are definitely distinguishable.

The first peak appears between 1.05 and 1.35 m b.s. (meters below surface) and is best defined by bifacial retouch flakes (Fig. 5). A major determinant of this mode is Feature 1, which was in the 1.25-1.35 m b.s. level and contained a large concentration of bifacial retouch flakes. The second major peak is defined by both classes and occurs between 2.05 and 2.45 m b.s. (Figs. 5 and 6). This mode coincides with the B-horizon of the lower buried soil (Fig. 3), and had been observed in the field. Caution must be exercised with these data, however. First, the classes were not uniformly recovered. Some of the levels (1.45-1.95 m b.s.), particularly in 99N/100W and 98N/100W, were not screened. However, shovel skimming <u>was</u> employed and when debris frequency distributions for these squares are compared against that of 100N/100W, which was screened throughout, no major discrepancies are evident. Second, the degree to which the original surface was disturbed during and after occupation, and the effect of pedoturbation after the surface was buried is not measurable. These processes may, however, have been a major factor in vertically displacing discrete occupational material.

To summarize, the debris recovered at the Wolf Creek Site exhibits a bimodal vertical distribution indicating that gross divisions of the cultural stratigraphy

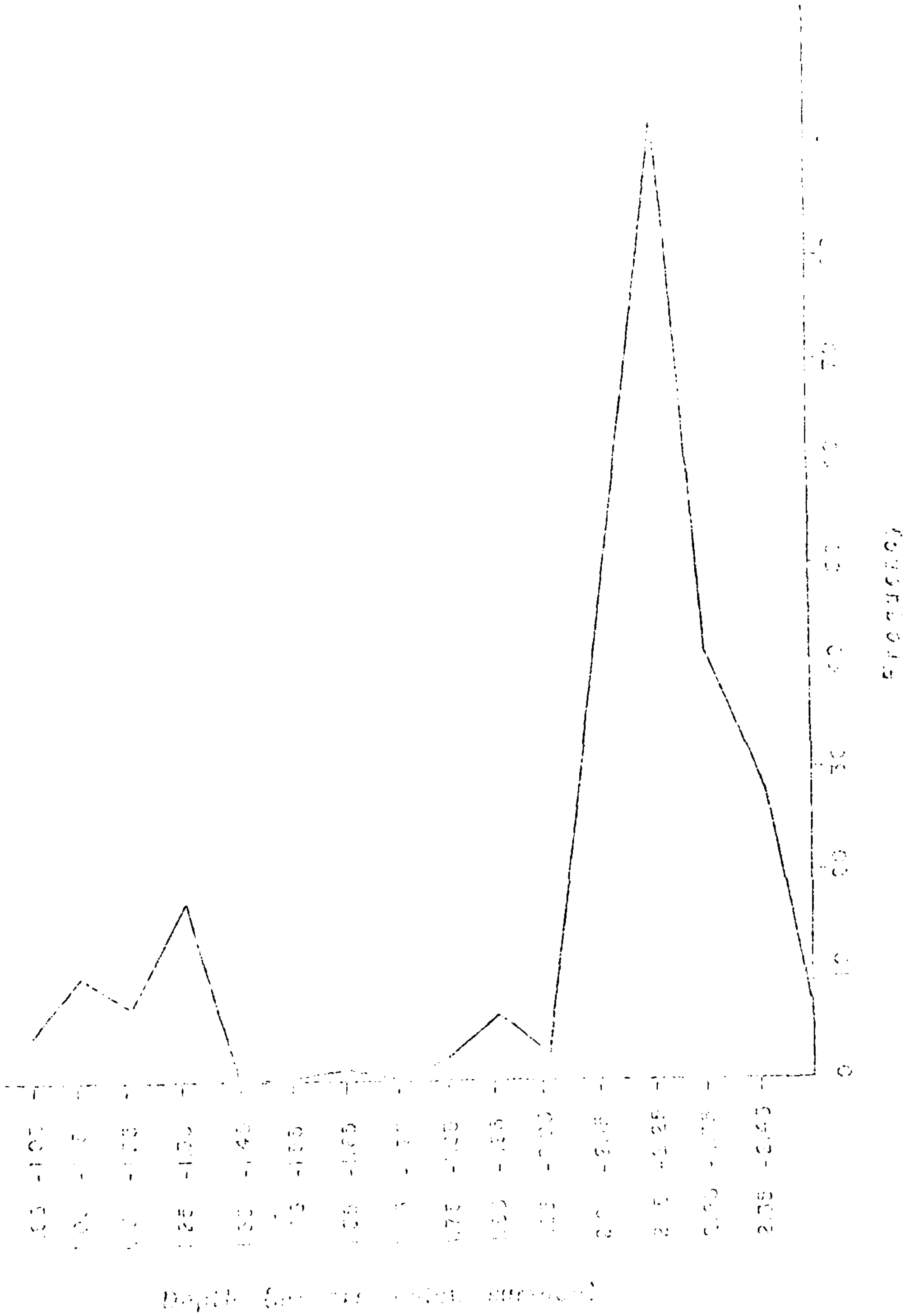


Fig. 5. Frequency distribution by depth of bifacial retouch flakes, all squares combined.

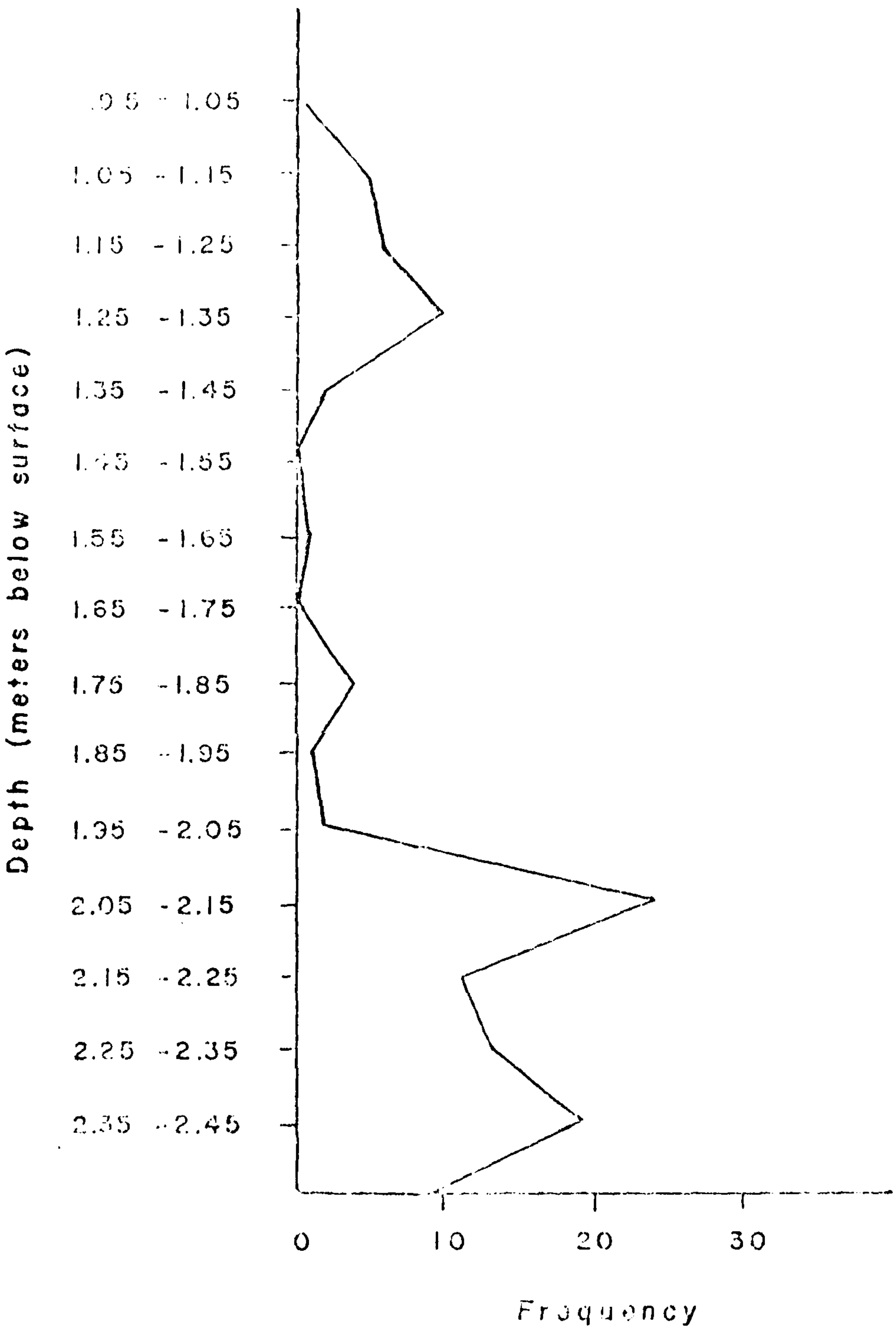


Fig. 6. Frequency distribution by depth of shatter, all squares combined.

TABLE 4

Wolf Creek - Distribution of Debris by Level: 99N/100W

Vertical Provenience	Level No.	DEBITAGE				Fire-Cracked Rock	Artifacts and Features
		Primary	Secondary	Bifacial Retouch	Shatter		
.80-.95		0	0	1	2	0	
1.00-1.05	2	0	0	2	0	1	Core
1.05-1.15	3	0	0	0	3	0	
1.15-1.25	4	0	0	3	3	0	Feature 1
1.25-1.35	5	0	0	0	1	26	
1.35-1.45	6	0	0	0	2	7	
1.45-1.55	7	0	0	0	0	2	
1.55-1.65	8	0	0	0	1	0	
1.65-1.75	9	0	0	0	0	0	
1.75-1.85	10	0	0	2	2	0	
1.85-1.95	11	0	0	3	1	0	
1.95-2.05	12	0	0	1	2	1	
2.05-2.15	13	0	1	16	19	0	Utilized flake: scraper
2.15-2.25	14	0	11	117	1	1	
2.25-2.35	15	0	2	28	5	2	
2.35-2.45	16	2	1	8	8	0	
2.45-2.55	17	0	0	4	3	0	

TABLE 5

Wolf Creek - Distribution of Debris by Level
98N/100W and 97N/100W

			DEBITAGE					
Square	Vertical Provenience	Level No.	Primary	Secondary	Bifacial Retouch	Shatter	Fire-Cracked Rock	Artifacts
98N/100W	.80-.95	1	0	0	0	0	0	
	.95-1.00	2	0	0	0	1	0	
	1.00-1.05	2	0	0	0	0	0	
	1.05-1.15	3	0	1	0	1	0	
	1.15-1.25	4	0	0	0	0	1	
	1.25-1.35	5	0	2	11	9	4	
	1.35-1.45	6	0	0	0	0	0	
	1.45-1.55	7	0	0	0	0	1	
	1.55-1.65	8	0	0	0	0	0	
	1.65-1.75	9	0	0	0	0	0	
	1.75-1.85	10	0	0	0	2	0	
	1.85-1.95	11	0	0	0	0	0	
	1.95-2.05	12	1	0	1	0	1	Core hammer-stone
	2.05-2.15	13	0	0	22	1	2	
	2.15-2.25	14	0	0	24	4	0	

TABLE 5: Continued

Wolf Creek - Distribution of Debris by Level
98N/100W and 97N/100W

Square	Vertical Provenience	Level No.	DEBITAGE Primary	Secondary	Bifacial Retouch	Shatter	Fire-Cracked Rock	Artifacts
97N/100W	.80-.95		0	0	0	0	0	
	.95-1.00	2	0	0	0	0	0	
	1.00-1.05	2	0	0	0	0	0	
	1.05-1.15	3	0	0	2	1	0	
	1.15-1.25	4	0	0	1	0	0	
	1.25-1.35	5	0	0	0	0	6	

do correlate well with natural stratigraphic units. An interpretation of the cultural significance of these distributions is uncertain. Each distributional mode could represent single occupations of short duration within relatively short time, or a long period of use for this site. Further excavation at the site, along with careful dating, could help solve the problem.

Chronology

Dating the occupation at Wolf Creek site at this point must rely on cross-dating the projectile point from the test trench. A literature search and comparison with the projectile points collected during the survey in the reservoir (Roper, Joyer, and Piontkowski, Vol. V, Pt. V) indicates that the specimen from Wolf Creek is not a locally common one. Several similar bifurcate base points (LeCroy) are present at Rodgers Shelter (McMillan 1971: 223; Fig. 46, K and L). Other well stratified sites in Missouri, such as Graham Cave (Logan 1952; Klippel 1971), Arnold Research Cave (Shippee 1966), and Tick Creek Cave (McMillan 1965; Roberts 1965), and Modoc Rock Shelter in Illinois (Fowler 1959) do not describe or illustrate bifurcate base points. However, several sites in West Virginia (Broyles 1966), and Tennessee (J. Chapman 1975, 1976) contain stratified deposits with numerous radiocarbon dates for bifurcated base points. Due to the great distance between these sites and Wolf Creek, the time of occupation at Wolf Creek can only be inferred.

The Rose Island site on the Little Tennessee River in eastern Tennessee is a well stratified site with deposits ranging from Early Archaic to Woodland (J. Chapman 1975). Bifurcate base points are stratigraphically separate from the succeeding and preceding horizons, and are dated between 8920$\pm$325 BP (GX-3597) and 8660$\pm$BP (GX-3598) (J. Chapman 1975: 211). Similarly, at the St. Albans site in West Virginia bifurcate base points date 8830$\pm$700 BP and 8150$\pm$100 BP (Broyles 1966: 40). The dates from both sites agree with one another, and seem to indicate a short time span for this point type: about 8900-8200 BP (see also J. Chapman 1976).

The geologic context at Wolf Creek suggests that a temporal provenience similar to the St. Albans and Rose Island sites is likely. The earlier discussion of the stratigraphy indicated that the cultural zone is incorporated within Rodgers Alluvium which was probably deposited 10,500-6000 years ago. Although this is a long time, the dating of the bifurcate base point elsewhere, and the position in the soil profile of the bifurcate base point at Wolf Creek suggests that the site could well have been occupied about 9000-8000 years ago.

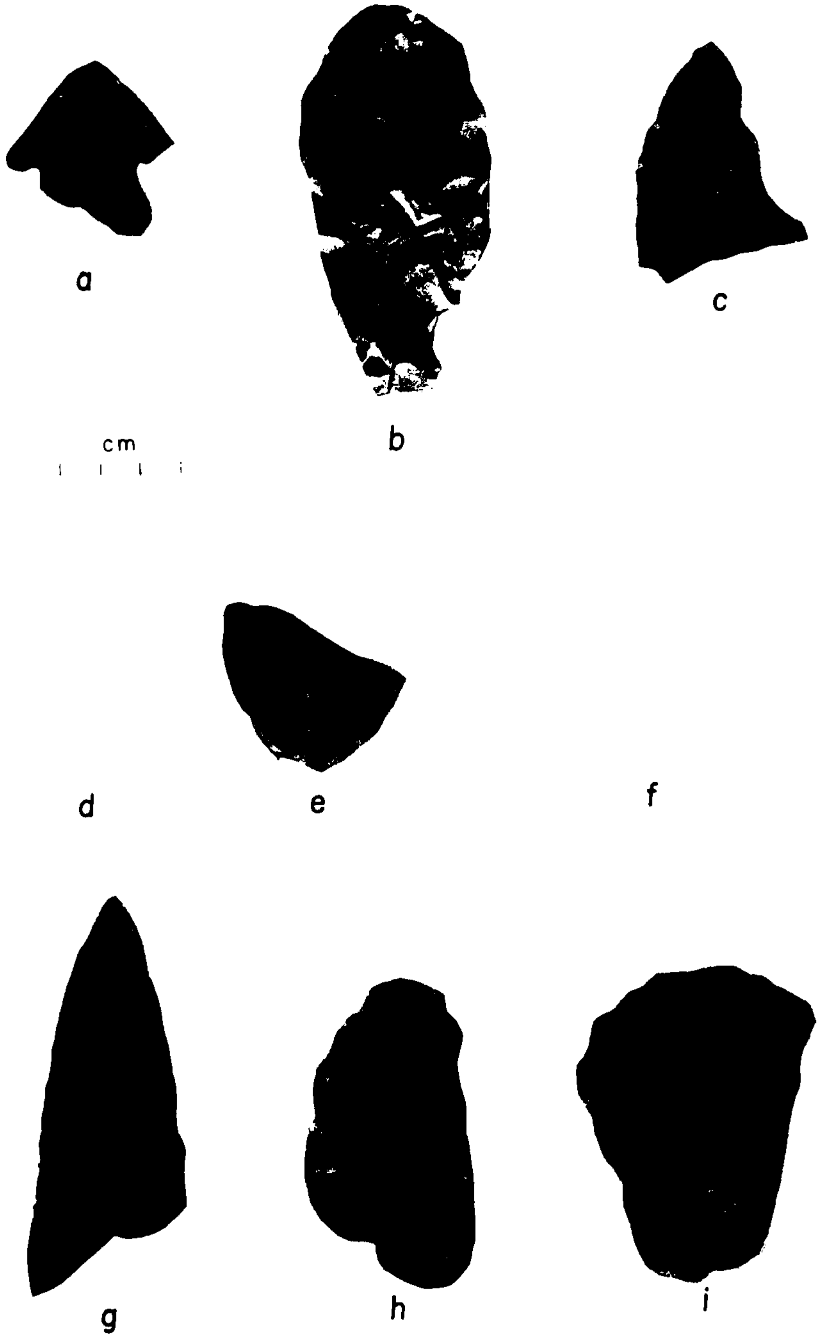


Plate 1: Artifacts a-f: Wolf Creek Site

g-i: Hand Site

THE HAND SITE, 23SR569

Description and Excavation

The goals and rationale for testing the Wolf Creek site, discussed in the previous section, are equally applicable to the Hand site: to determine the depth and significance of the archeological materials present and the relationship of these materials to the soil and stratigraphy. Of particular interest was the extreme depth both lay beneath the surface and the inferred antiquity of the archeological materials and the soils that developed over them.

The Hand site is ¼ mile north-northwest of the Wolf Creek site, at the footslope of the hills bordering the west side of the Osage River valley (Fig. 2). Two small intermittant streams which drain nearby hills join at a "T"-shaped confluence at the base of the hills. The streams flow approximately one eighth mile before emptying into the Osage River. The archeological materials were found eroding from the cut bank on the north side of the "T" shaped confluence.

The site was discovered during surface survey the day after the Wolf Creek site was recorded. The survey crew was walking the then-dry creek bed examining exposed banks for buried sites, when a complete Dalton point was found embedded in the cut bank. A few flakes closely associated with the point suggested that the material was <u>in situ</u>. Preliminary examination by Dr. Donald L. Johnson and by Michael Miller, Truman Project soils geomorphologists, (University of Illinois, Urbana-Champaign) and Dr. W. Raymond Wood, Project Director, (University of Missouri) substantiated hope that the archeological materials were in place and of some antiquity. The cultural materials lay in sediments that had the characteristics of a well developed soil, and seemed to be similar to early sediments described and dated in the Pomme de Terre River valley. This site, therefore, is significant for all project personnel. The archeologists were pleased to have a Dalton site with the cultural materials in situ, and the soils geomorphologist and geologist had the opportunity to describe and analyze sediments outside the type localities in the Pomme de Terre valley.

Michael Miller, O D Hand and the author returned to the site in late August, 1976 to expose a profile from the surface through the Dalton materials. The Dalton occupation was in the C horizon of a soil buried beneath a recent surface soil – an erosional episode had presumably truncated the A-horizon of the buried soil. No archeological materials were associated with the sediments relating to the surface soil and there was no other means of dating it.

In late August and early September 8 person days were expended finishing the soil profile and exploring the Dalton zone. The primary intent of the work was to expose and describe the soil horizons, to obtain a sample of the cultural materials and to assess their vertical position in the soil profile. To these ends, the testing at the site was considered successful.

Stratigraphy

In early Decemcer 1976 the site was visited by Donald L. Johnson, Michael V. Miller, Donna C. Roper, C. Vance Haynes and the author to describe the soils and sediments and to collect samples for quantitative soil analysis. Haynes has generously provided his field notes on the stratigraphy for this report. It must be cautioned that these notes are preliminary descriptions of the sediments and stratigraphy and do not include exact measurements of horizon depth. The notes, however, do indicate the two primary sediments and the general nature of the soils developed within them (Table 6) (Fig. 7).

The upper unit (0-60 cm) is primarily of colluvial materials, probably derived from the adjacent footslope following erosion of the upper A-horizon of the buried soil (Haynes and Johnson, personal communication). The bottom unit (below 60 cm) is a thick fluvial deposit which, pedologically, corresponds to the formation described as Rodgers Alluvium in the lower Pomme de Terre River valley (Haynes, personal communication). The terrace in which the Hand site is located (T1b) is the geomorphic expression of Rodgers Alluvium and is estimated to have formed 10,500-6000 BP (Haynes 1976: 52-60). The Dalton materials at the Hand site therefore appear to be *in situ* in a formation of appropriate age.

Artifact Description

The defining criteria and discussion of the class are described in the previous section of the Wolf Cre site lithic analysis.

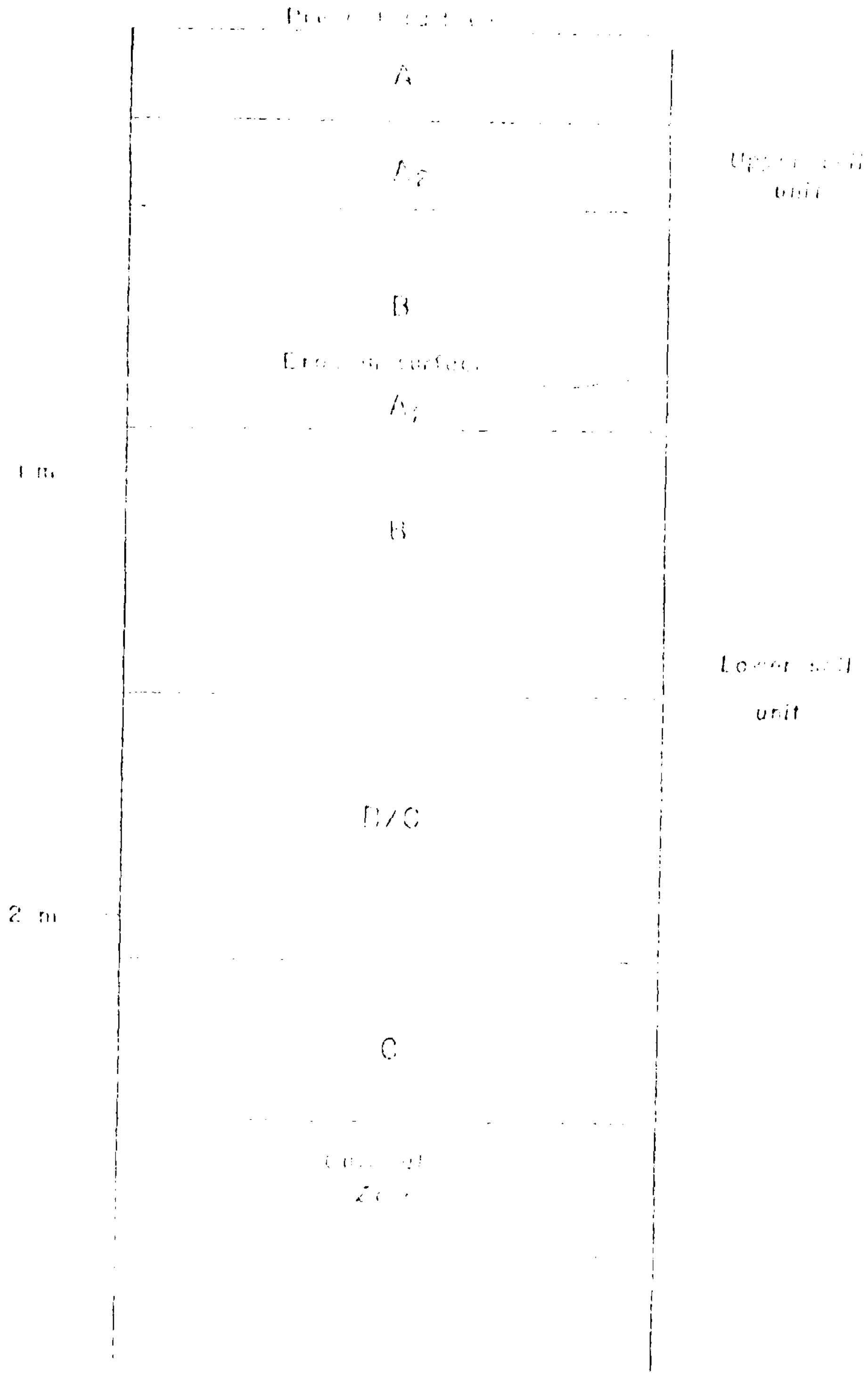


Fig. 7. Hand Site: stratigraphy and soils.

TABLE 6

Hand Site: Sediment Characterization
Transcribed from Haynes' Field Notes
of December 1976

0-20 cm	Dark brown organic clayey-silt.
20-40 cm	A_2?(incipient); light brown-gray clayey-silt; weak subangular blocky structure; possibly redeposited.
40-60 cm	Grayish-brown clayey-silt; weak medium angular blocky structure; angular chert pebble gravel.
60-80 cm	Pale gray silt; slightly platy, breaking to subangular blocky; A_2.
80-90 cm	Brown-gray very clayey-silt; rootlet molds; weak Fe and Mn stains; structure is weakly moderate prismatic breaking to subangular blocky.
90-120 cm	Brown-gray very clayey-silt; more Mn stains than above; structure is moderate to medium prismatic, breaking to subangular blocky.
120-150 cm	Mottled gray and brown very clayey-silt; strong to medium prismatic, breaking to subangular blocky; clay skins on ped faces.
150-210 cm	Mottled brown and light brown-gray clayey-silt; dark brown clay skins; Mn stains; moderate to medium prismatic, breaking to blocky structure.
210-300 cm	Light brown (tan) clayey-silt; numerous brown Mn pistides (1-2 mm); weak-coarse prismatic structure.

Class 1: Points - 1 specimen (Pl. 1g)

Description - Lanceolate. Blade - convex edge outline; one edge is serrated; a continuous line is formed from the haft element through to the blade, i.e., there is no shoulder indentation; the opposite edge lacks serrations on the bottom portion of the blade; the tip is lightly serrated; a slight shoulder is present; use-wear is exhibited along the entire edge, except near the tip. Haft element - light lateral and basal grinding is present; one of the ears is broken; the intact ear is not flared. Flaking - no basal thinning is exhibited in the basal concavity; flake scars on the body from the serrated edge extend to the mid-line; these scars are parallel and angle slightly towards the base; the other edge exhibits generally random flake scars; fine retouch flake scars are on the lateral and basal margins of the intact ear.

Discussion - Identification of this specimen is somewhat difficult, but it is probably a large Dalton point before it was extensively used and resharpened (see Goodyear 1974: 21-32 for a discussion of use phases of Dalton points). It is large and morphologically slightly irregular for a Dalton point, but is not unlike a specimen identified as Dalton from the Montgomery Site on the Sac River in Cedar County (Collins, et al. 1977: 48).

Unclassified Bifacial Tools

1. The first specimen (Pl. 1h) is ovate in general outline, but with four distinct edges. One transverse edge is straight, the other convex; the two longitudinal

edges are both convex. A notch is present on one transverse edge, but no other indication of hafting is exhibited. Large percussion-type flake scars are exhibited over the whole body, while retouching has been performed on one of the longitudianl edges forming a fairly high (56°) angle unifacial working edge. The transverse edge with the notch displays retouch flake scars adjacent to the notch. Dimensions: length = 75 mm; width = 39 mm; thickness = 11 mm; edge angles, transverse = 52° and 59°; edge angles, longitudinal = 56° and 46°.

2. This specimen appears to have been a large flake, the distal end being the portion recovered. A transverse fracture is the primary indication of breakage. The remaining portions of the lateral margins are convex, as is the single remaining transverse edge. All edges exhibit utilization flake scars, usually terminating in step fractures; utilization is unifacial, but is not continuous. Large flake scars on the main body indicate percussion thinning and shaping. Edge angle - average of all edges = 50°. Provenience - found out of context during initial survey of the site.

3. This specimen (Pl. 1i) has negative flake scars over all surfaces; it retains cortex on one surface. Retouch flake scars and a small amount of utilization are on one edge; this is perhaps a multi-functional tool, first used as a core and subsequently in a chopper-like manner, although apparent retouch could simply be the result of platform preparation. Edge angle = 79°. Provenience - approximately 10 meters downstream and at about the same level as the point.

Debitage

The remainder of the lithic material recovered consists of 1 primary flake, 4 secondary flakes, 30 bifacial retouch flakes, 2 flakes with cortex, and 28 pieces of shatter (refer to the lithic analysis of the Wolf Creek site for the defining criteria and descriptions of the above classes of debitage).

Discussion

The Dalton occupation at Rodgers Shelter was dated (Wood and McMillan 1976: 124) using charcoal from hearths at the base of Stratum I at 10,530±650 BP (ISGS-48) and 10,200±330 BP (M-2333). Although earlier than most dates associated with Dalton (C. Chapman 1975: 236) they appear to be valid when considered in their stratigraphic context. The materials at the Hand site are therefore tentatively placed within the period 10,500 to 9500 BP (McMillan 1976: 223).

In summary, sometime during the period 10,500 to 9500 BP the Osage River was rapidly aggrading, depositing large quantities of sediment, during which time a Dalton campsite at the base of the valley wall was occupied. A soil later developed in these sediments, lost its A-horizon through erosion, and was subsequently buried by colluvium from the adjoining hillside.

The archeological work at the site did not explore large horizontal areas. However, the investigations did show that early archeological materials are present in situations other than modern land surfaces and demonstrate the necessity for systematically investigating cutbanks and like exposures for comparable material.

SUMMARY

The primary goals of investigation at the Hand and Wolf Creek sites have been satisfied. Test excavations at the Wolf Creek site determined that approximately 1.5 meters of cultural deposits were present in a buried soil. A relative estimate of the time of occupation has been achieved: 9000 to 8000 BP. Furthermore, it has also been shown that the diagnostic projectile point, which aided in making the temporal estimation, does not frequently occur in archeological sites in Missouri, although it is a major type in Early Archaic sites in the eastern third of the United States. The antiquity of the occupation at the Hand site has similarly been estimated on the basis of a highly diagnostic point form which represents the transition from Paleo-Indian to the Archaic period. Finally, the geologic context of the Wolf Creek and Hand sites help to substantiate fluvial and geomorphic models developed elsewhere in the reservoir study area.

REFERENCES CITED

Ahler, S. A.

1971 Projectile Point Form and Function at Rodgers Shelter, Missouri. Archaeological Society Research Series 8.

1973a Post-Pleistocene Depositional Change at Rodgers Shelter, Missouri. Plains Anthropologist 18(59): 1-26.

1973b Chemical Analysis of Deposits at Rodgers Shelter, Missouri. Plains Anthropologist 18(60): 116-131.

Broyles, B. J.

1966 Preliminary Report: The St. Albans Site (46Ka27) Kanawha County, West Virginia. The West Virginia Archeologist 19: 1-43.

Chapman, C. H.

1975 The Archaeology of Missouri, Vol. 1. Columbia: University of Missouri Press.

Chapman, Jefferson

1975 The Rose Island Site and the Bifurcate Point Tradition. Report of Investigations 14, Department of Anthropology, University of Tennessee.

1976 Archaic Period Research in the Lower Little Tennessee River Valley. Report of Investigations 18, Department of Anthropology, University of Tennessee.

Collins, Charles D., James A. Donohue, and Andris A. Danielsons
1977 The Downstream Stockton Study: Investigations at the Montgomery Site, 23CE261. Report to the U. S. Army Corps of Engineers, Kansas City District. American Archaeology Division, University of Missouri-Columbia.

Fowler, M. L.
1959 Summary Report of Modoc Rock Shelter. Illinois State Museum, Reports of Investigations 8.

Goodyear, A. C.
1974 "The Brand Site: A Techno-functional Study of a Dalton Site in Northeast Arkansas." Arkansas Archeological Survey, Publications on Archeology, Research Series 7.

Haynes, C. V.
1976 Late Quaternary Geology of the Lower Pomme de Terre Valley. In: Prehistoric Man and His Environments: A Case Study in the Ozark Highland. W. R. Wood and R. B. McMillan, eds. New York: Academic Press.

House, J. H. and J. W. Smith
1975 Experiments in Replication of Fire-cracked Rock. In: Cache River Archeological Project: An Experiment in Contract Archeology, assembled by M. B. Schiffer and J. H. House. Arkansas Archeological Survey, Publications in Archeology, Research Series 8.

Klippel, W. E.
1971 Graham Cave Revisited: A Reevaluation of its Cultural Position During the Archaic Period. Missouri Archaeological Society, Memoir 9.

Langbein, W. B., and L. B. Leopold

1966 Quasi-equilibrium States in Channel Morphology. American Journal of Science 262: 782-794.

Leopold, L. B., and M. G. Wolman

1957 River Channel Patterns: Braided, Meandering, Straight. U. S. Geological Survey Professional Paper 282-B, pp. 39-85.

Logan, W. D.

1952 Graham Cave, An Archaic Site in Montgomery County, Missouri. Missouri Archeological Society, Memoir 2.

McMillan, R. B.

1965 Gasconade Prehistory: A Survey and Evaluation of the Archeological Resources. The Missouri Archaeologist 27(3-4): 1-89.

1971 Biophysical Change and Cultural Adaptation at Rodgers Shelter, Missouri. Ph.D. Dissertation, University of Colorado-Boulder.

1976 The Dynamics of Cultural and Environmental Change at Rodgers Shelter, Missouri. In: Prehistoric Man and His Environments: A Case Study in the Ozark Highland. W. R. Wood and R. B. McMillan, eds. New York: Academic Press.

Roberts, R. G.

1965 Tick Creek Cave, An Archaic Site in the Gasconade River Valley in Missouri. The Missouri Archeologist 29(2).

Roper, D. C.
1977 The Downstream Stockton Study. Cultural Resources Survey Report to the U. S. Army Corps of Engineers, Kansas City District, by the American Archaeology Division, University of Missouri.

Ruhe, R. V.
1975 Geomorphology. Atlanta: Houghton Mifflin Co.

Shippee, J. M.
1966 Arnold Research Cave or Saltpeter Cave. The Missouri Archaeologist 28: 1-40.

Wood, W. R., and R. B. McMillan (editors)
1976 Prehistoric Man and His Environments: A Case Study in the Ozark Highland. New York: Academic Press.

PART II

THE DISTRIBUTION OF MIDDLE ARCHAIC COMPONENTS IN THE TRUMAN RESERVOIR AREA

by

Janet E. Joyer

INTRODUCTION

In studying the distribution of Middle Archaic period sites in the Truman Reservoir area, it must be assumed that the locations of sites were selected on the basis of the availability of major resources within the immediate environments. Unfortunately, the exact environment of the area during the Middle Archaic period is not known at this time due to two complicating factors. First, the area presently lies in a major ecotone between the prairie region to the west and the Ozark Highland to the east. Secondly, the Middle Archaic period is the period during which the Altithermal climatic episode reached its height. These two factors taken together give an overall picture of an already unstable environment being acted upon by an increasing warming and drying climate. Consequently, it is difficult to determine precisely where the borders of the various environmental zones were during the Middle Archaic period.

The study of the locations of these sites is oriented around an attempt to answer the following two major questions:

1. What are the immediate locations of the sites?
2. What is the overall distribution of the sites in the reservoir area?

The answers to these two questions will help give us a spatial perspective on Middle Archaic settlement in an area which includes all major environmental zones (bottomlands, uplands, etc.). It therefore complements a study in a single zone (bottomlands) in the Downstream Stockton Study area (Roper 1977). Although a distributional study has definite limitations, perhaps some indications of seasonality and communication will be observed.

A major concern in this study is the effect of the Altithermal on the environment of the Middle Archaic peoples. An overall goal of this paper, then, is to add to the present knowledge of Altithermal adaptations.

ENVIRONMENT OF THE RESERVOIR AREA

Although the environment of the Truman Reservoir area was quite different during the Middle Archaic period than it is now, the difference is quantitative rather than qualitative. The same particular elements have probably always made up each environmental zone since the end of the Pleistocene, but the sizes of the zones have varied due to climatic changes over the millennia.

The area around the Lower Pomme de Terre River (McMillan 1976a) consists of five major environmental zones: upland prairie, bottomland prairie, oak barrens, oak-hickory forest, and bottomland forest. The prairies consist of various kinds of grasses, bluestems being the most common. Oak barrens are mainly grasslands with scattered oak, dominated by the post oak-black oak association. The oak-hickory forest consists of much the same type of vegetation as the oak barrens, but has a much greater species diversity, and higher arboreal density than oak barrens. The bottomland forest has the greatest variety of flora, due to the fact that the bottomland consists of many small zones: the area along the base of the bluffs, the floodplain, the riparian habitat bordering the streams, gravel bars, spring and slough borders, and the river channel itself. This habitat has various species of oak, hickory, elm, hackberry, sycamore and maple, plus a heavy undergrowth of briars, vines and bushes of various sorts.

The two dominant zones are the upland prairie (which is the major zone in the west) and the oak-hickory forest (which dominates the eastern part of the area). The border between these two zones is a mosaic ecotone, the position of which is constantly shifting. At present, the oak-hickory forest is moving westward, displacing the prairie grassland (McMillan 1976a). Federal Land Office Surveys indicate that this movement is fairly rapid, showing a substantial change even since the mid-nineteenth century. A discussion of the Altithermal will help explain the climatic reasons for this.

THE MIDDLE ARCHAIC PERIOD

The Altithermal

Any consideration of the Middle Archaic must take into account the fact that the world at the time of this cultural adaptation was undergoing a change in climate and was in fact at the height of a warming and drying period in some areas. This certainly would have affected human populations. It would have been an influencing factor in what they ate, where they settled, and their activities. It has even been postulated that there was an overall population decline during this climatic shift, due to a reduction in food sources (Nance 1972). This climatic trend is commonly referred to as the "Altithermal" (Antevs 1955).

The intensity and effects of this climatic upheaval varied throughout the world. In fact, pollen studies show that there is a great deal of difference in the manifestation of the Altithermal between such close areas as the American Southwest and the Central Plains. Studies at Rodgers Shelter (23BE125) indicate that this period of warming and drying began 8200 to 8600 years ago in the reservoir area (McMillan, 1976b). This was probably manifested by long, severe summer droughts. This trend gradually peaked and then began to return, about 4000 years ago, to the climate we see there today.

The environment at Rodgers Shelter during this fluctuation in climate shifted from an oak/hickory forest-edge environment, to a greater percentage of grassland prairie, which can stand greater heat and less moisture. This invasion of the prairie was a gradual shift in the prairie/forest border toward the east, followed by a gradual shift back to the forest-edge environment of the present (McMillan 1976a). This model is based on prehistoric faunal distributions, modern plant community patterns, sediment deposition at the shelter, and changes in activity patterns as seen in the archeological record. (Since the original draft of this paper was completed, F. B. King [1978] has completed a study of available potential plant foods near Rodgers Shelter. Her projections of plant availability in the early Holocene and the Altithermal demonstrate this shift very dramatically.)

This environmental shift meant a major shift in the food resources available to man at this time, for the vegetational change naturally led to a change in the animal life in the area. For example, acorn mast, a primary food of the present deer population in the Ozark Highland, becomes scarce during severe and prolonged droughts, such as the ones assumed to have been common during the Altithermal. Occurrences of this kind probably contributed to a decrease in the number of deer. Turkey and raccoon (forest-edge dwellers) would also decrease significantly, while a greater variety of small prairie animals such as cottontail rabbit and small rodents would become more abundant. Aquatic game (ducks and geese) would be driven downstream, following the shrinking streams.

It is important to realize that upland areas would be much more drastically affected by the increased severe droughts. The tributaries farthest from the main river channels would be the first to dry up and affect their surrounding biota. The encroaching prairie grasses could flourish until the height of the Altithermal, when conditions may have been so intense that, in some places, even it was unable to survive, and left the hillsides barren and susceptible to erosion. Meanwhile, the bottomland forests and prairies stayed relatively stable because their water supply was virtually unaffected.

The Altithermal would have a great deal more effect in an ecotone environment, such as the one in this study area, than in the core area of a region, because of the unstable nature of an ecotone (cf. Odum 1971). The significance of the Altithermal is profound: the effect of the changing climate on the flora, and consequently the fauna, called for specific adaptations that are reflected in the distribution of the Middle Archaic sites.

The Middle Archaic Adaptation

Rather than referring simply to a time period (which varies so much from one locality to another), the term "Middle Archaic" refers more significantly to a distinct cultural adaptation. The characteristics of this adaptation also vary from place to place, but a general description of the period gives a solid base from which characteristics may be added or subtracted in different localities.

Many chronologies have been suggested in an attempt to assign a time period to the Middle Archaic. Chapman (1975) gives a very general date of 7000 to 5000 years ago to cover the Middle Archaic in Missouri. McMillan (1976b), after studying the cultural sequence of Rodgers Shelter, suggests a more specific chronology. He divides the Middle Archaic adaptation into two separate horizons, representing two distinct patterns. These he calls Middle Archaic I and II, dated 8600 to 6300 years ago, with the change in pattern occurring between 8000 and 7000 years ago. The Middle Archaic is both preceded and succeeded by periods of very little occupation at Rodgers Shelter. In fact, 6300 to 3000 years ago represents a cultural hiatus at the shelter, with complete abandonment for some unknown reason. Although based on a single site, McMillan's chronology is a good indication as to the dates for the Middle Archaic in the rest of the reservoir area.

The subsistence of the Middle Archaic peoples consisted of a very generalized economy, and the Altithermal greatly affected the resources available to them. By limiting certain major resources, it required them to

TABLE 1

LOCATIONAL DATA OF MIDDLE ARCHAIC PERIOD SITES

	Elevation of site(ft.)	Elevation of nearest water source	Distance to that water (mi.)	Name of water (if named)	Type of water source	Divergences from river	Distance to permanent water	Name of permanent water	Major river drainage	Direction of exposure	Topographic setting	Relief (ft.)	Area of site M²
23BE125	700	680	.1	P de T R.	R	--		P de T R.	P de T	S	Sh	120	Sh
207	680	670	.2		IS	0	.5	P de T R.	P de T	Op	Bo	10	U
223	700	700	.2	Little P de T R.	PS	12		Little P de T R.	P de T	Op	Bo	20	U
242	670	670	.1	--	IS	0	.4	P de T R.	P de T	Op	Bo	10	700
285	720	720	.1	Little P de T R.	PS	18		Little P de T R.	P de T	Op	Bo	20	4300
299	680	670	.2	--	IS	3	.3	Hogles Cr.	Osage	Op	Bo	10	3000
353	700	680	.1	--	IS	1	.3	Osage R.	Osage	NW	Sl	80	U
375	730	650	.1	Osage R.	R	--		Osage R.	Osage	RT	RT	90	15883
420	690	660	.1	--	IS	1	.3	S. Grand R.	S. Grand	SW	Sl	80	1875
426	660	660	.3	P de T. R.	R	--		P de T R.	P de T	SW	Bo	40	U
500	700	690	.1	Little P de T.R.	PS	11		Little P de T R.	P de T	W	Bo	70	1800
573	760	730	.1	--	IS	2	.5	Osage R.	Osage	W	RT	100	11450
576	670	670	.1	--	IS	2	.5	Osage R.	Osage	Op	Bo	10	4500
584	670	650	.1	Osage R.	R	--		Osage R.	Osage	Op	Bo	10	15000
662	680	650	.2	S. Grand R.	R	--		S. Grand R.	S. Grand	NW	Bo	30	8000
or 434													
23HI216	700	680	.1		R	--		P de T R.	P de T	W	Bo	70	10000
228	700	680	.1	--	IS	0	.2	P de T R.	P de T	NW	Bo	120	600
232	710	690	.1	P de T R.	R	--		P de T R.	P de T	NW	Bo	50	1000
235	740	700	.1	--	IS	0	.2	P de T R.	P de T	N	Sl	0	1000
243	700	680	.1	P de T R.	R	--		P de T R.	P de T	W	Bo	120	2400
263	860	680	.2	P de T R.	R	--		P de T R.	P de T	RT	RT	190	50
23SR189	700	670	.2	Osage R.	R	--		Osage R.	Osage	Op	Bo	10	U
284	740	700	.2	Slough Branch	PS	4		Slough Branch	Osage	SW	Sl	130	45000
288	710	710	.2	Slough Branch	PS	4		Slough Branch	Osage	S	Sl	90	7000
31[illegible]	710	710	.2	--	IS	0	.2	Osage R.	Osage	NW	Bo	20	6000
456	750	700	.1	Gallinipper Cr.	PS	4		Gallinipper Cr.	Osage	SE	Sl	90	600
504	680	680	.1	--	IS	1	.2	Osage R.	Osage	Op	Bo	10	6000
505	730	700	.1	--	IS	3	.5	Osage R.	Osage	SW	Sl	70	300
531	820	760	.2	--	IS	1	.8	Sac R.	Sac	RT	RT	40	5625
567	680	680	.1	Osage R.	R	--		Osage R.	Osage	NE	Bo	140	U

LOCATIONAL DATA OF MIDDLE ARCHAIC PERIOD SITES

KEY

IS	=	Intermittent Stream
PS	=	Permanent Stream
R	=	River
P de T	=	Pomme de Terre
Bo	=	Bottomland
Sl	=	Slope
Sh	=	Shelter
RT	=	Ridge Top
Op	=	Open
U	=	Unknown
*	=	Only if different from nearest water source

expand their food variety. For example, at Rodgers Shelter they no longer depended primarily on deer and squirrel for subsistence, as they had in the past, and turned to a foraging economy with more emphasis on rabbit, terrestrial turtle and rodents. Fishing also seems to have been more common, with a definite increase in the use of freshwater mussels. A decrease in the number of complex crushing and grinding tools in the Middle Archaic occupation at Rodgers Shelter indicates a decreasing emphasis on plant processing. Evidence has been found at Phillips Spring (23HI216) to indicate that the first cultigen of the area, squash, was introduced during the Middle Archaic period (Chomko 1976; Robinson 1978). It is not possible, however, to determine what importance this cultigen had in the subsistence at this time.

The foraging subsistence of the Middle Archaic peoples may have required them to make seasonal moves. The absence of storage and cache pits lends support to this hypothesis (McMillan 1976b). This generalized economy, which involved spreading their food procurement energies over a larger number of species, was probably less efficient in terms of energy expenditure versus caloric return. It could be part of the cause that led to the abandonment of Rodgers Shelter at the end of the Middle Archaic.

An important activity during the Middle Archaic was the processing of raw hematite into red ochre. This is indicated by an abundance of mortars and pestles with hematite stains at Tick Creek Cave in the Ozark Highland. At Rodgers Shelter, there is an increase in "simple grinding" tools, with hematite residue on them. Hematite was readily available at this time. The warming and drying during the Altithermal is believed to have led to erosion on the hillsides (McMillan 1976b), exposing hematite deposits. The product, red ochre, likely had a decorative or ceremonial use.

A few new tools are present in Middle Archaic assemblages. The full-grooved ground stone ax and the celt, an ungrooved ax, became common. At Rodgers Shelter, specialized scrapers and perforators are common. In the manufacture of chert tools, there is the beginning of heat-treating, which was to become a common practice.

The Middle Archaic period is a cultural adaptation to a shifting climate. This shift caused changes in availability of animal, vegetal and mineral resources, producing a new diversity to which man adapted his subsistence and other activities.

Criteria For "Middle Archaic" Site Designation

Unfortunately, the only cultural material remaining for the Middle Archaic period in the Truman Reservoir area is lithic material. Since flakes and most tools are not assignable to cultural periods, projectile points are at present the only diagnostic artifacts for the Middle Archaic in the area.

Two point types are found to be far more common than others in Middle Archaic sites in the Ozark Highland. These are taken to be diagnostic of the period. The first type is most often called Big Sandy Side-Notched (but is also known as Raddatz, Cache River, Black Sand, and White River Archaic). The form is somewhat like the Graham Cave Notched (a Dalton point type) and may be descended from it (Chapman 1975). The other point type is Jakie Stemmed. This type is stemmed to corner-notched with a concave, flaring base (Chapman 1975). Both types are found together in many major Middle Archaic sites in Missouri: Graham Cave, Jakie Shelter, Rodgers Shelter, and the Rice Site.

On the basis of this diagnosis, 34 of the points collected during the survey were determined to be Middle Archaic, and 30 sites were found to have a Middle Archaic component.

DATA

The thirty sites with Middle Archaic components were located on U. S. Army Corps of Engineers topographic maps and analyzed according to variables involving elevations, water sources and topography. Then they were plotted on a map of the overall reservoir area (Fig. 1).

The variables were selected on the basis of the information they could supply to future studies involving such factors as water procurement, food procurement (both animal and vegetal), shelter, communication and various other activities. The following are the variables measured:

Elevation of site: the contour line at the lowest edge of the site, measured in feet to the nearest ten feet.

Elevation of nearest water source: the maximum elevation of the water at its closest point to the site.

Distance to the nearest water source: measured to the nearest mile.

Name of the nearest water source, if named.

Type of water source: intermittent stream, permanent stream, or river.

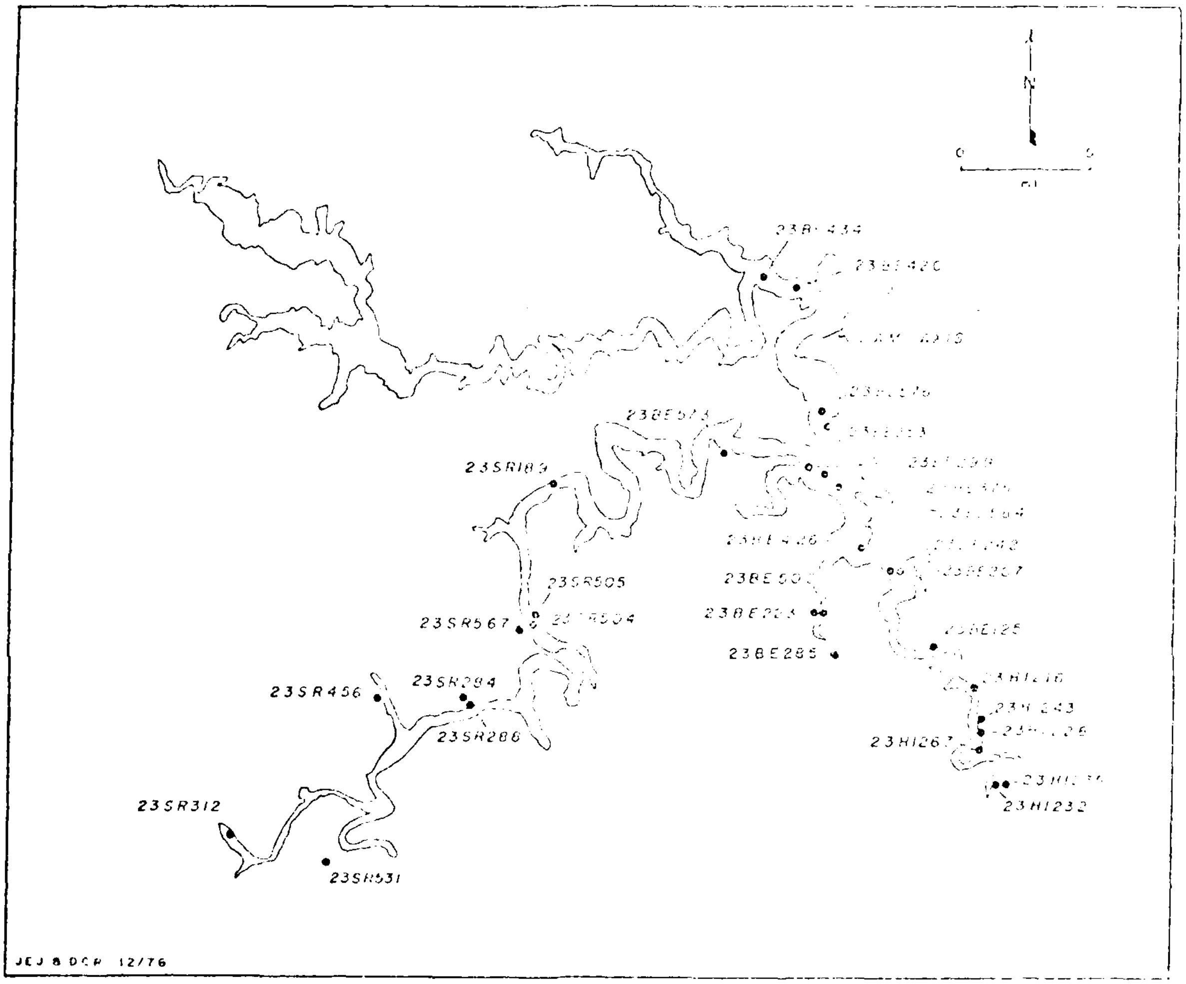


Figure 1. Middle Archaic Components in the Truman Reservoir Area.

Number of divergences of the water source from the major river: the number of points where another stream joins the course of the water source (not counting the point where it enters the river). "Major rivers" are the Osage, Sac, South Grand and Pomme de Terre rivers. Though perhaps less informative than rank designation, this variable serves the same purpose and was much more convenient to measure.

Distance to a permanent water source: a permanent water source is one indicated on the USGS topographic maps to be flowing the year around.

Name of permanent water source.

Major river drainage in which site is located.

Direction of exposure of site: N, S, E, W, NE, NW, SE, SW, open, ridge top.

Topographic setting of site: shelter, bottomland, ledge, or ridge top.

Relief within .1 mile radius of site: a measure of total relief, both above and below site, i.e., the lowest point is subtracted from the highest point within .1 mile radius, to the nearest ten feet.

Area of site: estimation by the recorder of the site as to the approximate site size.

One more variable was recorded: the type of site (base camp, temporary camp). However, the variable is so subjective to the individual recorder, that this information (even when it was available) was not used in this study.

INTERPRETATIONS

In interpreting the data, the trends within each variable can be studied. It is also helpful to compare and relate the results from two or more variables.

The sites range in elevation from 670 to 860 feet. However, studying elevations alone is not very informative because elevations vary according to the particular drainages in which the sites are located. Likewise, the elevation of each site's nearest water source is not inherently informative, as it is dependent on the type of source (intermittent and permanent streams generally have higher elevations than rivers). The major value of these two variables, then, is their relationship to each other, i.e., the vertical distance between the site and its nearest water source. Of the 30 sites, nine are at the same elevation as the water source, three are ten feet above it, seven are 20 feet above, five are 30 feet, two are 40 feet and there is one each at 50, 60, 80 and 180 feet above the source. The extreme distance of the last site (23HI263) is explained by the fact that there is an intermittent stream only slightly further away than the distance to the river (the closest source) with much easier access. The data from this variable do not seem to correlate with any of the other variables. What is most surprising is the lack of any relationship between the vertical distance to the water source, and the horizontal distance to it. One might expect that with an increase in one, a corresponding decrease would occur in the other. Despite the absence of enlightening relationships between this variable and any of the others, the results are valuable in themselves. Slightly less than one-third of the sites are at the same level as their nearest water source. Another one-third are between ten and 30 feet above their source. The remaining one-third are from 30 to 180 feet above it. Whether or not this pattern is more prevalent among Middle Archaic sites will be an interesting observation that can be made only when we have comparative data from other time periods.

The horizontal distance to water is just as important. In Nance's studies in the Southern Plains, he found that all substantial Altithermal occupations are no more than one-fourth mile from a perennial river (Nance 1972). In this study, similar results are found. Only one site is between .2 and .3 mile from its nearest water source. Of the remaining sites, one-third are between .1 and .2 mile from it, and two-thirds are within .1 mile of the nearest water. With this variable, it is interesting to look at the data as they are automatically grouped by county (Table 1). In this case, the county divisions are a good overall geographical grouping device. Counties divide the area into block units (vs. the long, slender units of drainages). By looking at these large geographic areas, we can consider the broader topography in the various areas. For example, St. Clair County has a proportionally larger amount of sites located .2 mile from water, and Hickory County sites are all within .1 mile. A possible explanation for this distribution is the terrain in these two counties. St. Clair, to the west, has more gently rolling hills as compared with the sharper relief of Hickory, to the east. In the flatter areas, perhaps a greater distance from the water source would not have been as inconvenient as in the hillier areas. The data for the relief within .1 mile radius of the sites agree with this idea. The sites located in an immediate area of greater relief are closer to their water sources.

By looking at what type of source the nearest water source is, we see that 44% of the sites are nearest an intermittent stream, 20% are nearest a permanent stream and 36% are nearest a river. It seems unusually high that 44% have intermittent streams as their closest source, since the present intermittent streams were probably even more intermittent during the Altithermal. But of this 44%, over half are in bottomlands, so they are near major rivers.

The next variable to consider is the number of divergences of the nearest water source before it enters the major river. This variable can give us information as to the remoteness of a site which may have had an effect on possible communication. Eleven of the 30 sites are actually on the river, five have water sources with no divergences aside from where they meet the major river, two have three, three have four, and the remaining three have 11, 12 and 18 divergences. It is interesting to note that these last three sites are the only three that have the Little Pomme de Terre River as their nearest water source. In this case, the locations are not really an indication of remoteness. Since these sites are very near the Little Pomme de Terre (a major tributary of the Pomme de Terre River), the number of divergences simply indicates that there are many streams joining the Little Pomme de Terre between the respective sites and the major river, the Pomme de Terre. In other words, the Little Pomme de Terre River could almost be called a major river, in which case the number of divergences between the nearest water sources and the major river would be much smaller.

It is important to note that all of the sites in the Pomme de Terre drainage have either no divergences aside from their entry into the river, or are right on the river (with the exception of the three sites near the Little Pomme de Terre River). This almost certainly has to do with the hillier terrain of that area. Again, looking at the overall terrain of the various parts of the reservoir area does show interesting things. For example, the sites in St. Clair County, which is much flatter overall, tend to have more divergences than those in the other counties (aside from the three sites on the Little Pomme de Terre in Benton County). Hickory County (more rugged terrain) sites all have no divergences. This has major implications for transportation and communication. Sites in a rugged terrain would be more reliant on waterways for transportation than sites in a flatter area which would lend itself to overland travel. Therefore, we would indeed expect to see the sites in the eastern part of the reservoir area within easier access of the major river.

Comparing divergences to the type of water source, we see that the sites with the most divergences (4, 11, 12 and 18 divergences) are all of the sites that have permanent streams as their closest water source. The water sources of sites nearest intermittent streams have no, one, two, or three divergences. This shows that sites on intermittent streams are not remote from the river. The evidence of so many sites being in bottomlands agrees with this.

This interpretation is also supported by the data from the next variable, the distance from the site to permanent water (where the nearest water source is not permanent). Of the 13 sites that have intermittent streams as their nearest water sources, four are within .2 mile, three are within .3 mile, one is within .4 mile, four are within .5 mile, and one is within .8 mile of a permanent source of water. Of these 13 sites, all but one have a major river as the permanent source of water, rather than a permanent stream. Thus, in both divergences and actual distance, the sites on intermittent streams are fairly close to a major river. This could be related to communication, because if a permanent source of water was needed strictly for drinking water or water resources, permanent streams would have been adequate. However, close proximity to a major river would have been highly advantageous for purposes of communication. The site that is .8 mile from a permanent water source (23SR531) is the only site that has the Sac River as its nearest permanent source. This, plus the fact that 23SR531 is farther away from its closest water source than the majority of sites, again exemplifies the tendency in the western part of the reservoir (the Sac River is extremely west) for greater horizontal distance between sites and their water sources.

The next variable is the exposure of the site. No sites are exposed directly to the east. One site each is exposed to the north, northeast and southeast. Two are exposed to the south, four each have western and southwestern exposures, five have northwestern exposures, nine are open and three are on ridge tops. Open sites are most common (all are in bottomlands). Seven of the nine open sites are in Benton County, which is where the bottomlands are broadest. Among the non-open sites, there is a definite tendency for general western exposure, which is unusual. If warmth was a concern, this seems very impractical in that the sun would not warm the camp until later in the day. If we had more data on the type of site each site constituted, perhaps it could be explained if the sites with western exposure were seasonal summer camps, in which a western exposure would keep the site shaded from the hot sun. Perhaps the prevailing winds were a determining factor in the selection of western exposure. Hickory County, where relief is the most dramatic, is the most consistent in direction of exposure. All sites there are exposed to the north, west or northwest (plus one ridge top site). St. Clair County sites have the most diverse exposures. However, whether there is a meaningful relationship between the exposure of the site and its location in the reservoir area is doubtful.

The data on topographic settings show 18 bottomland sites, seven slope sites, four ridge top sites and one shelter site. Bottomland sites are overwhelmingly preferred (60% of all sites). The probable stability of the bottomland environment during the Altithermal may account for this. All bottomland sites are either open (nine sites) or are exposed to the overall west (nine sites).

The relief of the sites, referring to the total relief within .1 mile of the site, varies from zero to 190 feet, with the mean at 62 feet. The only relationship this variable has with any other, is the previously stated correspondence between relatively greater relief and closer horizontal distance to the nearest water source. An analysis (now in progress) which measures the relief within .1 mile only above the site may produce new results.

After collecting the data on the areas of the sites, it was decided that this is not a variable that can give valid results when measured by many different people.

Because this variable was measured in most instances on the basis of lithic scatters, the actual area of a site is very difficult to determine and each surveyor has his own bias. The data for this variable are shown (when available) in Table 1 but are not considered reliable enough to be seriously regarded.

Distinct groupings can be observed in studying the distribution of sites in the overall reservoir area. The distribution can best be discussed in terms of the drainages in which the sites are located. The Osage River drainage has 15 sites, the Pomme de Terre has 13, the South Grand has two and Tebo Creek has none. A map of the reservoir area (Fig. 1) shows an obvious tendency towards heavier distribution in the southeast. The major drainage in the southeast is the Pomme de Terre River, which has a greater concentration of known sites per area than any of the other drainages. The Osage, which is also south, but west, has a fairly even scattering of sites, with a prominent cluster in the eastern part. The South Grand, which is north of the Osage but also in the western part, has only two sites, both of which are at the extreme eastern edge of the river. The Tebo, which is the major drainage to the northwest, has no sites.

Considering the climatic trends during the time these sites were occupied, this preference for southeastern sites seems natural. The southeastward shift of the prairie into the Highland caused a drier environment in the northwestern areas.

The recent study of the Coffey Site (Schmits 1976) in eastern Kansas is a good example of an in-depth study of an Archaic site on the floodplain of a major river. This site is in an ecotone similar to the one in the

Truman Reservoir area, with grassland plains meeting oak-hickory forest. It was found that although the upland biotic communities were undergoing dramatic changes during the Altithermal, the composition of the floodplain forest remained stable. Evidence indicates that the occupations of the site were temporary and of short duration. The site was used for residential living (rather than for specialized activities), but only during the drier seasons, because of its situation on the floodplain where it was subject to seasonal flooding. The horizons studied at Coffey represent only late summer and fall occupations, but distinct variation in exploited resources can be observed between those seasons. This example of an Archaic adaptation involving seasonal exploitation of a bottomland area may be similar to the adaptive pattern of the Middle Archaic peoples in the Truman Reservoir area.

CONCLUSIONS

Meaningful patterns can be seen in the locations of the sites. In general, the tendency is for Middle Archaic sites to be in the bottomlands, either open or exposed to the west, with an intermittent stream as the nearest water source. This pattern therefore agrees with the conclusions of the study in the Downstream Stockton Study area where Middle Archaic components were located well within the bottomlands (Roper 1977). The variability we see within each variable often follows patterns related to the location of the site in the reservoir area.

Two characteristics of the sites give indications of seasonality. Situated in the bottomlands, the sites must have been affected by seasonal flooding. Also, the many sites with western exposures would have been advantageous mainly in the summer.

The overall distribution of sites in the reservoir area also shows a definite pattern. Sites are concentrated in the southeastern part of the reservoir area, where the environment was more habitable. However, it will be interesting to see the distributions of sites in other time periods. This will tell us whether it was the specific climate of the Middle Archaic period which causes this distribution, or whether there is a universal preference through time for the hillier terrain and lusher environment of the Ozark Highland.

REFERENCES CITED

Antevs, Ernst

1955 Geologic-Climatic Dating in the West. American Antiquity 20(4): 317-335.

Chapman, Carl H.

1975 The Archaeology of Missouri I. Columbia: University of Missouri Press.

Chomko, Stephen A.

1976 The Phillips Spring Site, 23HI216: Harry S. Truman Reservoir, Missouri. Illinois State Museum Society. Springfield, Illinois.

King, Frances B.

1978 Vegetational Reconstruction and Plant Resource Prediction. IN: Holocene Adaptations within the Lower Pomme de Terre River Valley, Missouri, ed. M. Kay. A project conducted for the U. S. Army, Corps of Engineers, Kansas City District. Illinois State Museum Society, Springfield, Illinois. Draft.

McMillan, R. Bruce

1976a The Pomme de Terre Study Locality: Its Setting. IN: Prehistoric Man and His Environments: A Case Study in the Ozark Highland. Ed. W. Raymond Wood and R. Bruce McMillan. New York: Academic Press, pp. 13-41.

1976b The Dynamics of Cultural and Environmental Change at Rodgers Shelter, Missouri. IN: Prehistoric Man and His Environments: A

Case Study in the Ozark Highland. Ed. W. Raymond Wood and R. Bruce McMillan. New York: Academic Press, pp. 211-232.

Nance, C. Roger

1972 Cultural Evidence for the Altithermal in Texas and Mexico. Southwestern Journal of Anthropology 28(2): 169-193.

Odum, Eugene P.

1971 Fundamentals of Ecology (3rd Edition). Philadelphia: W. B. Saunders.

Robinson, Christine

1978 The Archaeology of Phillips Spring. IN: Holocene Adaptations within the Lower Pomme de Terre River Valley, Missouri, ed. M. Kay. A project conducted for the U.S. Army Corps of Engineers, Kansas City District. Illinois State Museum Society, Springfield, Illinois. Draft.

Roper, Donna C.

1977 The Downstream Stockton Study: The Cultural Resources Survey: Pt. I, Archeological Resources. A project conducted for the U.S. Army Corps of Engineers, Kansas City District, pp. 1-143.

Schmits, Larry J.

1976 The Coffey Site: Environment and Cultural Adaptation at a Prairie Plains Archaic Site, M.A. thesis, University of Kansas, Lawrence.

✩ U.S. GOVERNMENT PRINTING OFFICE 1983 666-683